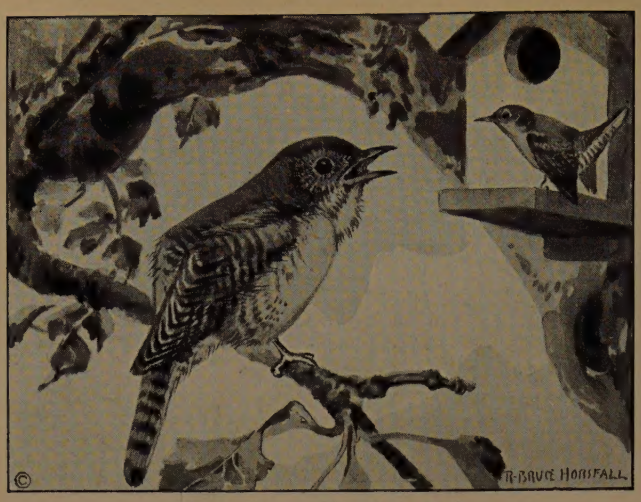
NATURE MAGAZINE

MAY 1933 35¢ VOL. 21, NO. 5



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INSECT PHOTOGRAPHY

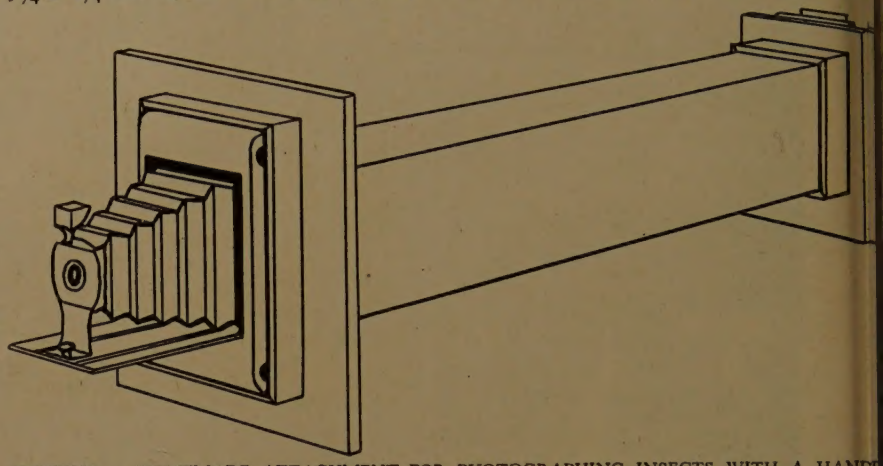
BY M. E. PHILLIPS

In the whole field of Nature photography there is probably no more fascinating hobby than taking pictures of insects. The abundance of these small animals all about us in the fields and woods offers an unlimited source of material, and a great variety from which to choose. The average amateur photographer has usually shied away from this type of picture because he has felt that it would not be possible to secure good results with the camera he had. In entomological laboratories, where most of the serious work of this kind is done, much specialized and costly apparatus is used for this purpose. However, it is not necessary to have expensive equipment in order to take creditable pictures of at least some insects. With a few adaptations upon the equipment you now probably have, you may secure, with patience and a little study, pictures of which you need not be ashamed.

Insects are small in size, and if an attempt is made to photograph them with a Kodak or other small hand camera in the ordinary way, it will be found that the resulting picture shows such a small image of the subject that it is not at all satisfactory. This is due chiefly to the fact that such small cameras usually have a short bellows; that is, the distance from the lens to the film is perhaps only five or six inches. With such a short bellows it is not possible to place the camera close to the insect, say a foot or less, and at the same time have the image focussed on the film or plate. If, however, some means can be devised whereby the distance between the lens and film can be increased, the image may be brought into focus, and, incidentally, greatly enlarged.

Apparatus for doing this may readily be constructed by anyone handy with tools. It consists essentially of a long box with the camera attached to one end, and a slide for the film holder at the other. The length of the box, of course, will govern the amount of enlargement possible with any given lens, and value will be added to the equipment if it is constructed in two sections which fit tightly together, and with arrangements for the film holder to slide on the back end of either section. This will give two different lengths of "bellows," and will thus facilitate photographing insects of different size and with different degrees of enlargement.

The equipment I have been using, which included an f6.3 anastigmat lens from a 3¼ x 4¼ camera, has a maximum distance from the lens to the film of about forty inches. With this I can secure an enlargement of eleven times, an ordinary fly nearly covering a 4 x 5 film. While a picture can be made with a rapid rectilinear lens in this equipment, much clearer, sharper results will be obtained with an anastigmat lens. Although the length of the box must be governed by the amount of enlargement desired, its width and height on the inside must at least equal the size of the film used.



SHOWING A HOMEMADE ATTACHMENT FOR PHOTOGRAPHING INSECTS WITH A HANDY CAMERA. STRAPS HOLD THE CAMERA IN PLACE

A PHOTOGRAPH OF A FLY TAKEN WITH THE EQUIPMENT DESCRIBED BY THE AUTHOR. THE MAGNIFICATION HERE WAS ELEVEN TIMES

The box should not be difficult to construct. It may be made of thin quarter inch boards, preferably of whitewood, ply-wood or other material which does not warp easily. It must, of course, be absolutely light-tight. To achieve this latter purpose, strips of heavy black paper should be pasted over the cracks, or they should be filled with plastic wood, or both. The inside should now be painted with a dull finish black paint to prevent reflections. The connection with the camera and holder must also be constructed so that no light can leak in.

In fitting the camera to the front end, it back will, of course, have to be removed so that there will be an unobstructed line from the lens to the film holder at the other end. The camera may then be attached in the following manner. Nail over the front of the box a thin board (three-eighths inch ply-wood is good), somewhat larger than either the camera or the box end. In the middle of this has already been cut a hole of a size and shape just to fit the opening in the back of the camera. With the latter fitted carefully in place over the hole, now attach cleats to the front of the board so that they will fit snugly on all four sides of the camera, just tight enough that the latter will slide readily into place. These cleats serve both to help hold the camera in position and to exclude light. They should extend far enough out around the sides of the camera to be effective for this purpose, and must be painted black on the inside. A better, more light-tight connection will be achieved if, around the hole inside the cleats, a piece of black felt is glued, against which the camera will press when in place. In a position to take pictures, the camera must be held rigidly in place, pressed tightly against the felt. This may be done by the use of two straps, one across the upper end of the camera and one below. Strips of wood held in a similar position by hooks accomplish the same purpose.

In constructing the slide for the film or plate holder on the back of the box, equal caution must be exercised to exclude light. Make all fittings snug, and paint them black. Do not close over the rear end of the box so that you cannot look directly into it, for a second simple holder containing a ground glass must be made to slip temporarily into place for focusing. Care must be taken to have the ground glass, when it is in place, just the same distance from the lens as the film will be. Plates, cut film or film pack may be used in this apparatus.

With your box constructed, and your camera in place, you are now ready to take pictures of small objects. The subject needs to be placed only a few inches from the lens. With the ground glass holder in position, the focusing is done most easily by having the camera and its extension on a

ooth surface and sliding the whole back
l forth to get the right distance from the
ect. Focus as accurately as possible with
diaphragm wide open and then shut
wn to a small stop before taking the pic-
e. After focusing, remove the ground
ss holder, insert the film holder and take
picture.

The amount and quality of light, and the
gth of exposure will necessarily be partly
perimental until you become familiar with
apparatus. Remember, however, that the
posure must be far longer than for most
es of picture. Daylight is probably the
st source of light, though direct sunlight
the subject should be avoided as causing
o high contrasts. As a rough guide for
posure, the accompanying illustration of
cluster fly was taken with the forty-inch
ellows" length, the diaphragm set at f-
, and a time of thirty seconds. The light
ed consisted of two photoflood bulbs, sup-
emented by a dim light from a window.
utside, with bright daylight, you might try
e same sort of thing at five seconds as a
st experiment.

It must be kept in mind that in insect
hotography you are doing what might be
nsidered portrait work on a small scale.
are must be taken therefore to light the
bject effectively. If your source of light is
om above, for instance, the heavy shadows
nderneath may be brightened up by using
piece of white paper as a reflector, just as
ou often use a sheet to reflect light on the
ark side of a portrait sitter. Plain white
ackgrounds, placed far enough back to be
ut of focus, are effective in insect work,
hough black or dark gray may be preferable
or light colored objects. Avoid, however,
ackgrounds that are cut up with contrasty
hadows.

Probably one of the greatest difficulties
ncountered will be in attempting to get
nsects to stay still long enough to get the
ecessary exposure. With very sluggish in-
sects, patience and observation will usually
vercome this. In other cases a little chlo-
roform or ether will sometimes quiet an
insect for the necessary time. When you
are photographing a fairly large insect which
refuses to behave, however, it may be killed
outright in a cyanide bottle or with ether,
and after it has just begun to stiffen may
be posed successfully in a life-like position.
Close observation of its normal attitude
when alive, and considerable care are neces-
sary in this procedure. A tiny touch of glue
under each foot, and a temporary prop to
hold the body up until it becomes stiff, may
prove helpful.

When selecting subjects for insect pho-
tography, some of the general rules which
apply to ordinary snap shots still hold good.
For instance, pictures which tell a story,
that is, which show some significant phase
of the insect's life history, such as egg-laying
or feeding habits, may be more interesting
than a simple "portrait." Then too, the sim-
ple rules of good composition should be
observed if possible.

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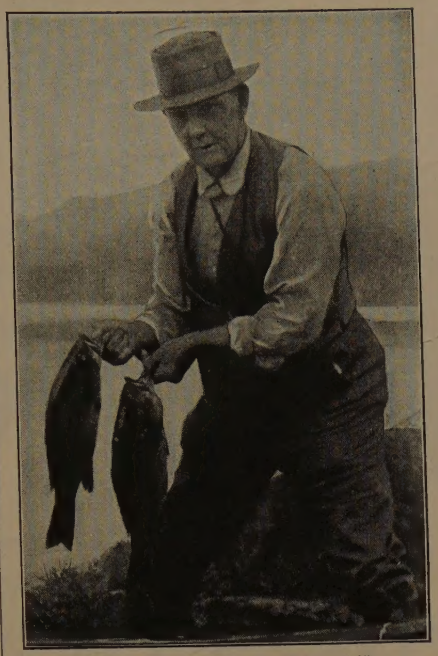

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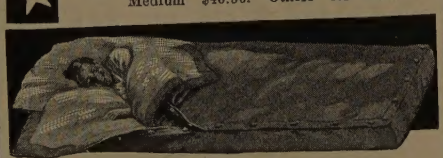

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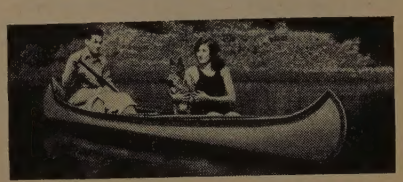

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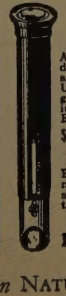

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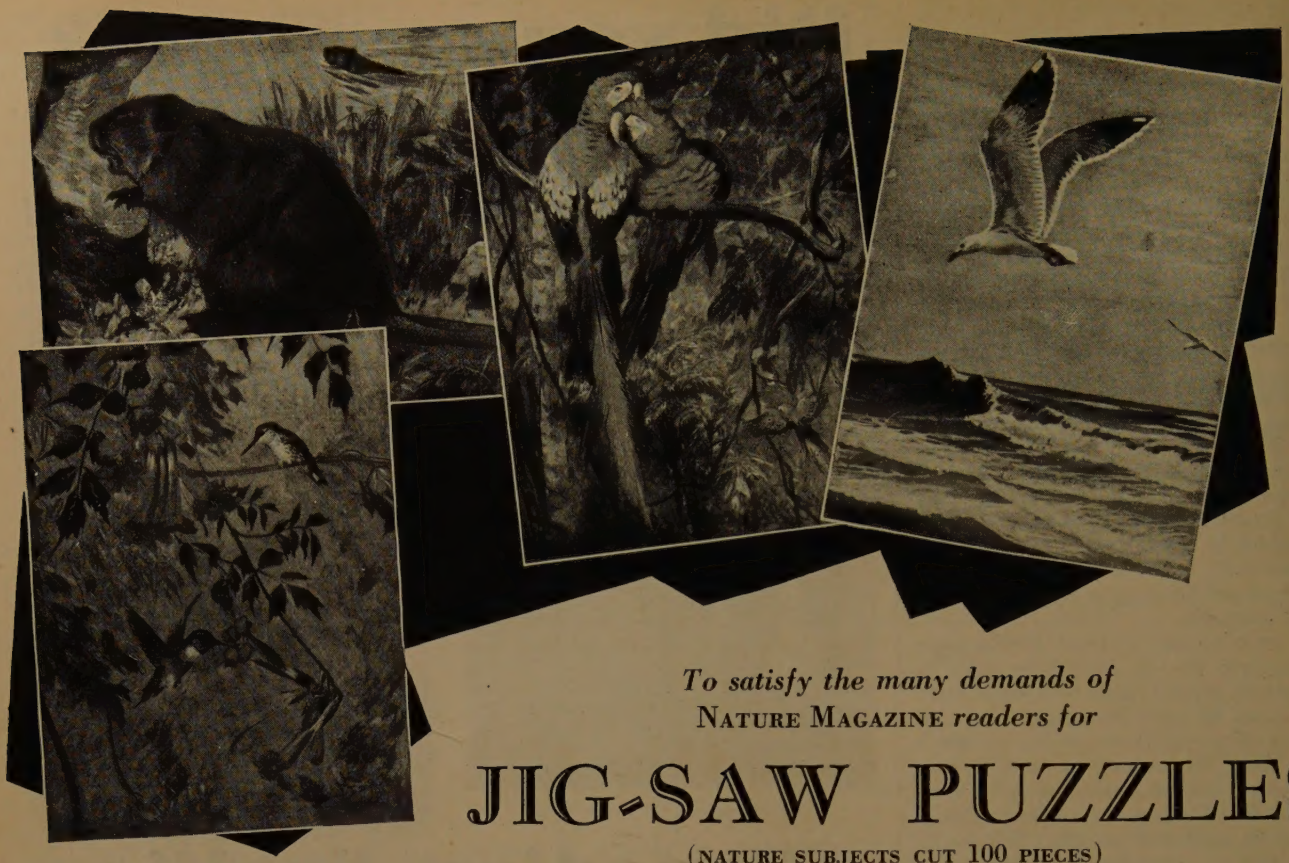

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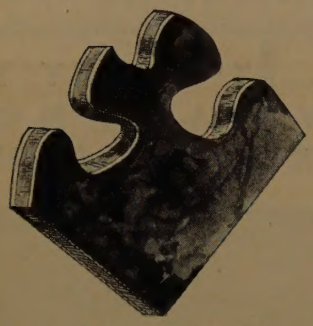

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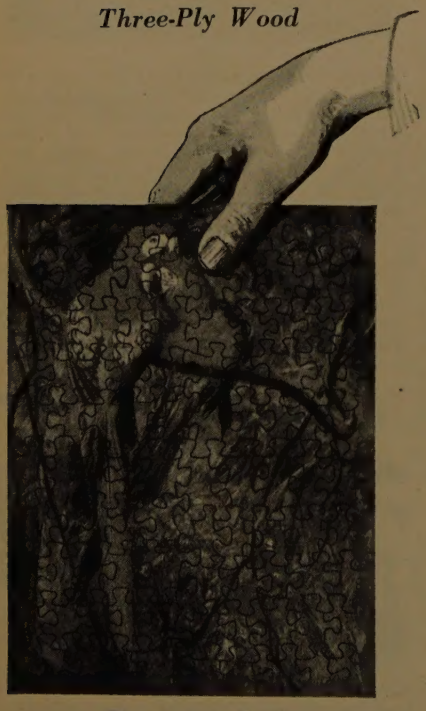

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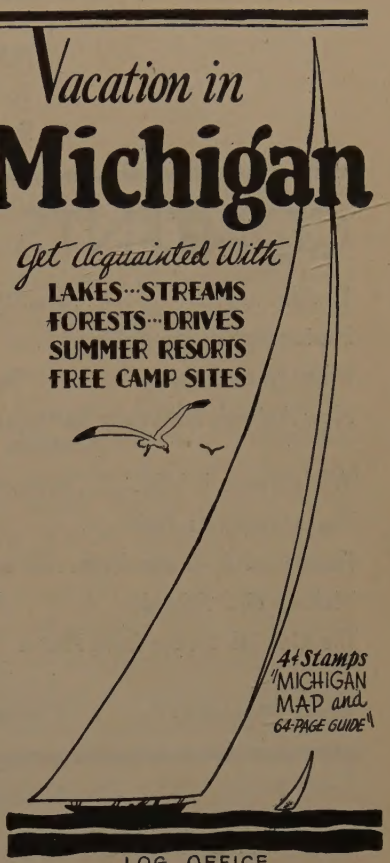

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OIL POLLUTION

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"WILD ducks lie dead and dying by the score, even hundred, on the South Beach this week, as they have lain for the past week or ten days. Helpless from floating oil, they seek the land, forewarned by some instinct of their fate, and there, in such slight shelter as they can find among the low beach hills, die miserably."

This is quoted from the *Martha's Vineyard Gazette* for February of this year. The story continues to paint a sad and vivid picture of the ducks, most of them eiders, trapped by the insidious oil as it floats upon the tide. And this is not an isolated tragedy. It is multiplied many times where oil-polluted waters take toll of sea bird life, kill or injure shell fish or crustaceans, and upset the entire balance of life in the sea.

Oil pollution is therefore an important phase of conservation. It is a part, not only of the problem of preserving wild life and food sources in the sea, but, as well, conservation of mineral oils. It is an issue of international significance demanding the cooperation of all maritime nations.

What has been done about it? In 1924 the Oil Pollution Act was passed. Under this the dumping of oil or oily bilge from vessels was prohibited within the three-mile limit. No restrictions were placed upon land industry situated on or near navigable streams and dumping their waste into such water courses. This last fact, coupled with the extreme difficulty of any effective enforcement of the Act itself, has brought charges of discrimination from the steamship people and a more or less careless disregard of the law.

In recognition of the international significance of the question, there was held in Washington, D. C., in 1926, a convention of the maritime nations. An agreement was drawn up binding the signatories to the dumping of no oils within fifty miles of any coast. Ten nations signed; three—Germany, Italy and Japan—did not. The result was an ineffective and comparatively unobserved pact.

So far as inland waters are concerned legislation of varying efficacy has been locally enacted to check the oil pollution nuisance. In some instances these laws appear to have accomplished their purpose, have been enforced and have brought about a diminution of the pollution. In other cases there are reports of increasing menace from oil waste, with laws entirely inadequate to meet conditions and with a resultant menace both to public safety and to aquatic life. In certain instances, where serious attempts have been made to correct the situation, it has been found that the laws are difficult or impossible of enforcement.

These are not, however, insuperable problems. Cooperation with and between the states, and between the states and a progressive attitude on the part of the Federal Government, can and should bring about a solution. Water is a vital part of our biologic and economic structure. When there is too much of it there is flood and destruction; when there is too little there is drought and destruction; when water is poisoned there is death and destruction. Industry or special interests have no vested right to bring about any of these conditions.

Perhaps most important, and certainly most difficult of regulation, is the problem of oil on coastal waters. Here it becomes an international question. It is an issue that should be above politics and the selfish concerns of vested interests. It is also a problem of economic significance since it involves both waste of mineral oils and wild life.

Some steamship companies have faced the issue and have commanded strict observance of rules against dumping oily bilge, or have installed oil separators on their vessels. These items of equipment reclaim the oil from the bilge water with a resultant saving in fuel costs. Majority opinion appears to be that separators are worth the investment, but it is safe to say that the large majority of oil-burning vessels are not so equipped. And it is equally safe to observe that the majority of these oil-burners pump their oily bilge overboard when and as they wish.

It is thus we find the situation. On the one hand we have the Nature lover and the sportsman seeking the conservation of bird life; we have the important consideration of wise and efficient use of our supply of fuel oils; we have the question of preserving from contamination certain sources of food supply inherent in the sea; we have the bather who prefers to dive through surf that is not slimy with oil. Against these we have arrayed the political and financial power of the shipping industry of the world, not to exclude the navies, our own having been, in the past, none too careful about how and where it dumped oil.

We have no patience with an attitude that foregoes any regulation because it is hard to enforce. If it is necessary to require that all oil-burning vessels, to be licensed or cleared in and out of a port, be equipped with and use oil separators, then let it be required. Let us demand a right to eat lobsters untainted with fuel oil and to bathe on clean sea beaches. Above all, let us do away with the multiple tragedies, such as that of Martha's Vineyard, with their terrific annual drain upon our aquatic bird life.

"SLEEPING WHERE NIGHT OVERTOOK THEM, THE OLD FELLOWS ON THE GROUND, THE LIGHTER YOUNG ONES IN HAMMOCKS OF GROWING VINES ABOVE THEIR HEADS"

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MBONGO AND NGAGI

TWO GORILLAS WHO LIVE FAR FROM THEIR NATIVE MOUNTAINS

BY BELLE J. BENCHLEY

MANAGER, SAN DIEGO ZOOLOGICAL GARDEN

EVERY morning I begin my day with a visit to Mbongo and Ngagi. Thus are the working hours happily launched with a few moments of friendship and confidence that we three share together. It is an understanding based upon the months during which our acquaintance has been tried and has ripened firmly. It is a friendship which, for me at least, has been filled with fascination as I have watched these twain learn to live and adjust their lives to their surroundings.

Young or old, few escape the fascination of the monkey house, and the cages which hold the larger apes always draw an admiring audience. In this article about two rather famous gorillas, we hear about some of their more intimate moments and details of their personalities not on display to the casual visitor to the zoo. The comparatively few gorillas that have survived in captivity for any long period of time give added interest and importance to observations and studies of these apes.

The two gorillas came to us from Martin Johnson, after they had lived with the Johnsons for nearly one year. They came already familiar with man and his ways. Since their arrival they have become more and more familiar. Children and adults alike stand before their cage to watch them. More questions are asked daily about them than about any other creature in the Garden. And since they have been with us I have made daily notes, thus recording our mistakes and our successes together and setting down my observations of the pair from a human and personal point of view rather than with a scientific objective.

Mbongo and Ngagi, the names, are of Swahili origin, and are modifications of the names given them by the Johnsons. Mbongo is the last syllable of the native name for the mountains in which they were captured, Alumbongo. Ngagi is a native abbreviation of Ingagi, the Swahili word meaning gorilla. They are as different from each other in looks and disposition as two people could be. Mbongo is friendly, impulsive, affectionate and a clown. Ngagi is reserved, suspicious, overbearing and greedy. Toward Mbongo she is always a tyrant, and yet she displays greater affection and concern for him than he ever does for her.

Together they weighed two hundred and sixty-nine pounds when they arrived at San Diego. They could not have been more than four or five years old. They were in excellent condition physically and mentally, thanks to the care Martin Johnson had given them. They had been accustomed to captivity in a happy and healthy manner, and had never been exploited or abused.

On the day of their arrival they walked out of the roomy shipping crate, in which they had lived much of the time for a year, into what must have looked like utter freedom. Their cage is eighteen feet high, twenty feet wide and forty feet long. It has a sand floor, an oak tree, fallen logs, swings and a large pool. Heavy ropes are suspended from the ceiling and low shelves are fitted in the corners. Their home is entirely open and out of doors. There is always the fresh air and sunshine, living trees around them and the blue sky overhead. Their sleeping quarters are always open; they have not been shut in for a single day no matter what the weather. They enjoy playing in the rain as do some children. Yet the crowd cannot approach them too closely, and they can always hide in their sleeping rooms if they wish to avoid the curious populace.

Wild animals usually leap from their crates expecting freedom, or slink out in fear of the unknown. These apes walked out as though they had been doing that very thing all of their lives. One behind the other they stalked to the very center of the cage, looking neither to the left nor the right. Then Ngagi turned toward Mbongo and they gazed earnestly into each other's eyes. They had not uttered a sound, yet many in the crowd of spectators felt and still believe that they had communicated with each other.

The order in which they left the cage is significant, but the importance was entirely lost upon me at the time.

PHOTOGRAPH BY ADAMS AND McCAFFERTY

MBONGO, THE FRIENDLY AND CURIOUS, IS ABOVE, WHILE BELOW IS NGAGI, EVER SUSPICIOUS AND STERN AND TYRANNICAL TOWARD THE OTHER

I simply made note that the larger ape left the shipping crate and entered the cage, closely followed by the smaller. Had I tried to interpret this act, I would probably have thought that the larger one was the more fearless animal, which is false, or the more dominating, which seems to be true. Yet it was, had I but known, the first indication of sex that we were to receive. In the jungle, the male leader of a band stands to one side while the whole troop of gorillas passes in front of him, the females leading, followed by the youngsters and the aged males. Then the male leader follows his assembled band.

After their silent communion, Ngagi sat down on a low cement block and I was impressed with the fact that her posture was entirely human—back erect, knees bent and slightly parted, the entire sole of both feet resting flat on the floor before her. Mbongo made a leisurely examination of the cage, touching nothing but scanning everything, and then, apparently satisfied, returned to Ngagi.

The keeper arrived with some fruit and vegetables which they accepted and ate with the same relish they had shown at meals since a few minutes after their capture. Having dined and assured themselves of their safety, the two gorillas rose, and, beating upon their chests almost simultaneously, began to box and wrestle. Greater familiarity with these creatures would have taught me that this was not so much actual play as a form of showing off; their reaction to the crowd. Having watched the growth of this response in both of the apes since they came to us, I will always regret not knowing how much of this had been acquired during their stay at Central Park, where they were visited by many more people than see them here.

The change from a natural life to an artificial one must be more difficult in animals of so high an order as these and must increase with the increase of age at the time of their capture. But now, for the first time, the actual change from a nomadic life to a sedentary one was begun in earnest. Happy gypsy children, they had followed the trails of their elders wherever the choicest vegetation had led them. They had wandered at will, resting in day nests made by sitting in one favorable spot and pulling to them all the food they wanted. The refuse would pile up around them, and, when their stomachs were full, they slept away the warm hours until aroused by their leader to move on. Perhaps following a pattern their troop had left before, or entering into virgin ground where agreeable food was abundant. Sleeping where night overtook them, the old fellows on the ground, the lighter young ones swinging in hammocks of growing vines above their heads.

Now their life is confined by a cage, even though it is large as cages go, and the monotony must be appalling. They have to accept the food brought to them, and although we vary it as much as possible, this too must be to them what boarding house meals become to a family man. Eating is no longer a thing of whim and appetite. Three times each day, the service gate opens and their keeper emerges with their pans of food and pails of milk.

It was amazing how soon they knew him and their own utensils. They learned early not only whence he came but into what eating periods their day was divided. At first they gazed over the world-at-large from the top of their tree, but soon we noticed that half an hour before meal time, their gaze was concentrated upon the service gate, and when Henry came out both of them were quickly down the tree by way of the rope and standing at their door to meet him.

At first they were awkward and slow on the wire and the tree, but agile on the ropes. They have, however, shown marked development, and they seem to remember from experience to use the same hand or foot that has aided them most in previous attempts. They are much more cautious than the other great apes, never swinging from limb to limb over any distance. They never let go of one object until they have a firm, safe hold upon another. To drop from a five-foot limb to the ground is still an adventure for them.

Our collection of great apes is the only one in which the gorilla is placed in a position of equal advantage with the other apes, because here they have the same social surroundings, the same companionship and the same opportunities as the orang-utans and chimpanzees. Comparison between the four types on exhibit here, and some brief preliminary experimentation and observation, lifts the gorilla to a higher plane mentally than it has occupied before.

It has been our policy to do nothing with these two apes that will in any way jeopardize either their bodily welfare or their mental peace. This has been received with some criticism by many who would like to use them in commercial ways. Nothing of a pecuniary nature, or no contribution to science, seems so important to me as the natural development of this pair of animals to maturity. The probability of their living naturally their entire span of life grows with each day they are successfully kept.

Osa Johnson told me that of all the great apes she felt sure that gorillas alone preferred women to men. The preference that Mbongo showed for her would indicate that her opinion was well founded. She asked me to give them special attention in an effort to gain their complete confidence. This was a pleasant task because already they were accepting with their lips offerings of food from my hands. But after her visit to the Zoo, I began a daily visit to them; preferably alone and inside their cage where they would not be interrupted and where my own efforts might not appear as a publicity stunt.

Mbongo was friendly with every one, and would greet me readily, almost from the first, but it was not for several months that Ngagi showed any preference for me, or any special interest in my appearance. At this time she began to show that she welcomed me even out in front with a group of visitors, and her attention to me in the back of their sleeping quarters far surpassed anything she offered to her keepers. She was greatly concerned one day when I appeared with a small boy in my arms, and, after peering at him for a few minutes, she turned her back solidly upon me, refusing to glance in my direction even at my most wheedling tone.

I smile many times in the light of my greater familiarity with gorillas at our interpretations of their actions at the time of their arrival. For what we took for indifference was actually an acute consciousness of the crowd

PHOTOGRAPH BY LEWIS WAYNE WALKER

MBONGO, IN PENSIVE MOOD, WONDERS WHAT IT IS ALL ABOUT OR CONJURES UP SOME MEMORY OF HIS NATIVE MOUNTAINS AND THEIR FORESTS

PHOTOGRAPH BY LEWIS WAYNE WALKER

NGAGI TAKES A LOOK AROUND AT HER AUDIENCE WITH A STERN EXPRESSION BEFORE SHE LEANS OVER TO DRINK FROM THE POOL OVERFLOW

and their strange environment. What we took for exuberant spirits and childish play was showing off in a true Tom Sawyer style. And now I verily believe that their extreme dignity and poise, their lack of interest in their surroundings on the day they arrived, was entirely assumed; that underneath that reserve they were in even greater mental turmoil than I was, but that they had a greater inhibition about showing their feelings.

Sometimes when I listen to the people around the cage speaking about the gorillas and hear the adjectives used to describe them, I feel as defensive as I should for a maligned human being. If the speaker is obviously the right sort and I feel sure I will not be misunderstood, I sometimes make an opportunity to correct the mistaken opinions. And then I usually find that I am actually surrounded and am delivering a free lecture upon my experiences with gorillas.

The physical adaptation so far has been perfect because there has been nothing of an alarming nature at any time. The changes in temperature between the Alumbongo Mountains, where they were captured, and San Diego are minor, but the daily rains and dripping mists of their mountains have given way to long, dry seasons of southern California. The deep shade of their tropical forest has been replaced by the constant glare of our California sunshine, and the elevation at which they live has dropped from twelve thousand to three hundred feet. Their journey to San Diego was, however, by slow stages and fitted them gradually to these changes. Their outdoor life and their happiness in the society of each other has done much to carry them over the difficult time of such adjustment as has been necessary.

A graduate student from the local State College, one of a class making observations, remarked that they were all in all to each other. This is true so far as the gorilla world is concerned. But each day they are accepting more and more another world. At first I trembled to think what would happen to one of them that should be left alone. Now I have every confidence that, no matter how deplorable such a loss would be, no matter how much the remaining one would miss the other, it would not be impossible to supply other companionship that would, in a measure, fill the gap. They show plainly that they miss me when I am too busy to spend a little of every day with them. They are both tremendously interested in the young pair of chimpanzees next door, and it is a friendly, playful interest. They are learning to beg from us and the crowd, and I am convinced if either of them were alone almost any one could go into the cage and play with or handle the other at will.

Ngagi, being slower to become friendly than Mbongo, depends more upon him for companionship than he does on her. Even with me it was months after she showed great interest before she would allow me to touch her. The day she did capitulate was a great one for both of us, and triumphant as I felt, she had actually gained the greater victory for she had conquered her own fear and reluctance. I will never forget her expression when she turned to look straight into my eyes. We were very close together and great beads of perspiration stood out upon her black face. Then she sighed and relaxed against the bars. She has never refused my touch since that time, although she did not for a long time approach me when anyone else was present.

One very recent incident in regard to Mbongo is too precious to omit, yet I tell it with a certain reluctance lest I appear sentimental to a foolish degree. I had been busy and tired and had had no more than a race or a few words with the gorillas for more than a week. Sunday morning early, when I hoped it might be private, I slipped over

the fence and went up to the wires to see them. I had no treat to offer and after a few pats and some conversation, Ngagi lost interest in me. I walked over to another corner where Mbongo was waiting his turn. His joy at seeing me was evident and he pushed up as close as he could to the wire where I sat. He looked steadily into my eyes and kept getting his face closer and closer. He has done this frequently and then reached through the wire with one finger to touch my glasses. He frequently pulls pieces of my frock through and places them between his lips. And one day he pulled my sweater through and bit off a pearl button which he carried in his mouth and played with for hours. To please him, I turned my face sideways and pressed it against the wire. He also pushed his face against the cage as hard as he could until I felt the pressure of the wire. Then he stuck out his lips to touch my face as he does my dress. But the thickness of the wire prevented his reaching me. Quick as a flash he stuck out his tongue as far as he could and touched my cheek with his wet, warm tongue. It was a startling surprise, because I had expected nothing like this.

Mbongo was surprised and delighted at his own temerity. He stood erect and beat his chest with all of the gusto in the world. A laugh from the crowd which had gathered made me realize that the action had been plainly seen and a small boy called out, "Does his tongue feel like a dog's?" I realized, of course, that it did not, that it was warm, smooth and as soft as that of a small child. There had been nothing repulsive to me about the gesture of affection because the gorillas are exceedingly clean in their habits, being actually fastidious in comparison with the hideous indecencies of the chimpanzees.

PHOTOGRAPH BY EUGENE P. COOPER

A FAVORITE POSTURE FOR PURPOSES OF WHAT APPEARS TO BE THE DEEPEST THOUGHT. IT WOULD SEEM SOMETHING MOMENTOUS IS BREWING

Mbongo and Ngagi show none of the ferocity earlier writers attributed to the gorilla. They are, in fact, exceedingly good-natured toward each other and those of us who do the most with them. Only twice, and then under trying circumstances, have I seen anything that I could interpret as anger. In both of these affairs, the meek and patient Mbongo stood firmly for what was apparently a matter of principle and it was the dominating Ngagi who ran, in each instance, nursing a gash of some size. Ngagi was also the one to turn with overtures of peace, holding out her arms for an embrace or indulging in one of her very rare intervals of "flea-picking". I fully believe that the male dominance of Mbongo will soon assert itself and, when that time comes, in spite of her piggishness, in spite of her overbearing, selfish nature, Ngagi will meekly permit the traditions of the gorilla to rule her conduct.

There is still so much to be learned from these two gorillas that this is only a kindergarten attempt, as it were, to convey some of my interest to others. It will be most interesting to tie up what we learn from these two with the observations of gorillas in their natural habitat.

The advantage of watching the same two creatures all of the time offsets in some degree the artificiality of their lives. Many things which the study of gorilla trails still leaves obscure may be explained by proper study and interpretation of the lives of these two. They are apparently as lacking in self-consciousness as any normal child. Their physical development is like that of the children of all species. Both have lost their milk teeth since arriving in San Diego. Mbongo lost all of his lower ones at once and Ngagi her upper ones.

Their sex development seems slow and as yet we have seen nothing that could be actually interpreted as sex

play or sex-consciousness. Sex indications are there in Mbongo's strutting response, his severe defense and his always demanding that Ngagi precede him. On the other hand, Ngagi indulges at rare intervals in flea-picking, a truly feminine trait of all primates, and present calculations, weights and measurements would indicate that Mbongo is rapidly gaining on her in size and strength.

Their broad, flat feet with the heels and insteps, mark the beginning of man's ability to walk erect. Their short toes, their short fingers with real thumbs, even their sway backs show higher development than the other anthropoid apes. These indicate that the gorillas have come a long way with man upon that ancient road that leads upward from where the others apparently stopped. But far back along that path they also took another turning or loitered by the way to eat and sleep in the warm tropical jungle, while man passed on to those heights where he acquired the power of speech. But from these two careless happy children of the jungle we hope to learn unknown things of our own childish impulses, our controlled activities and our unconscious reactions, which have their foundation in the ancient history of man.

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HOW ANIMALS BEHAVE IN EARTHQUAKES

BY ADELAIDE WILSON ARNOLD

ON FRIDAY evening, March the tenth, came one of the worst earthquakes Southern California has ever known. We were fortunate enough to be staying in a desert village on the border of the badly shaken zone, and our stout little tiled cottage was undamaged. Because we were outside the congested area, free from the noise and tumult of falling buildings and terrified and wounded humanity, we had time to notice little things, and to hear sounds that would have been lost in the dreadful crash of a falling city.

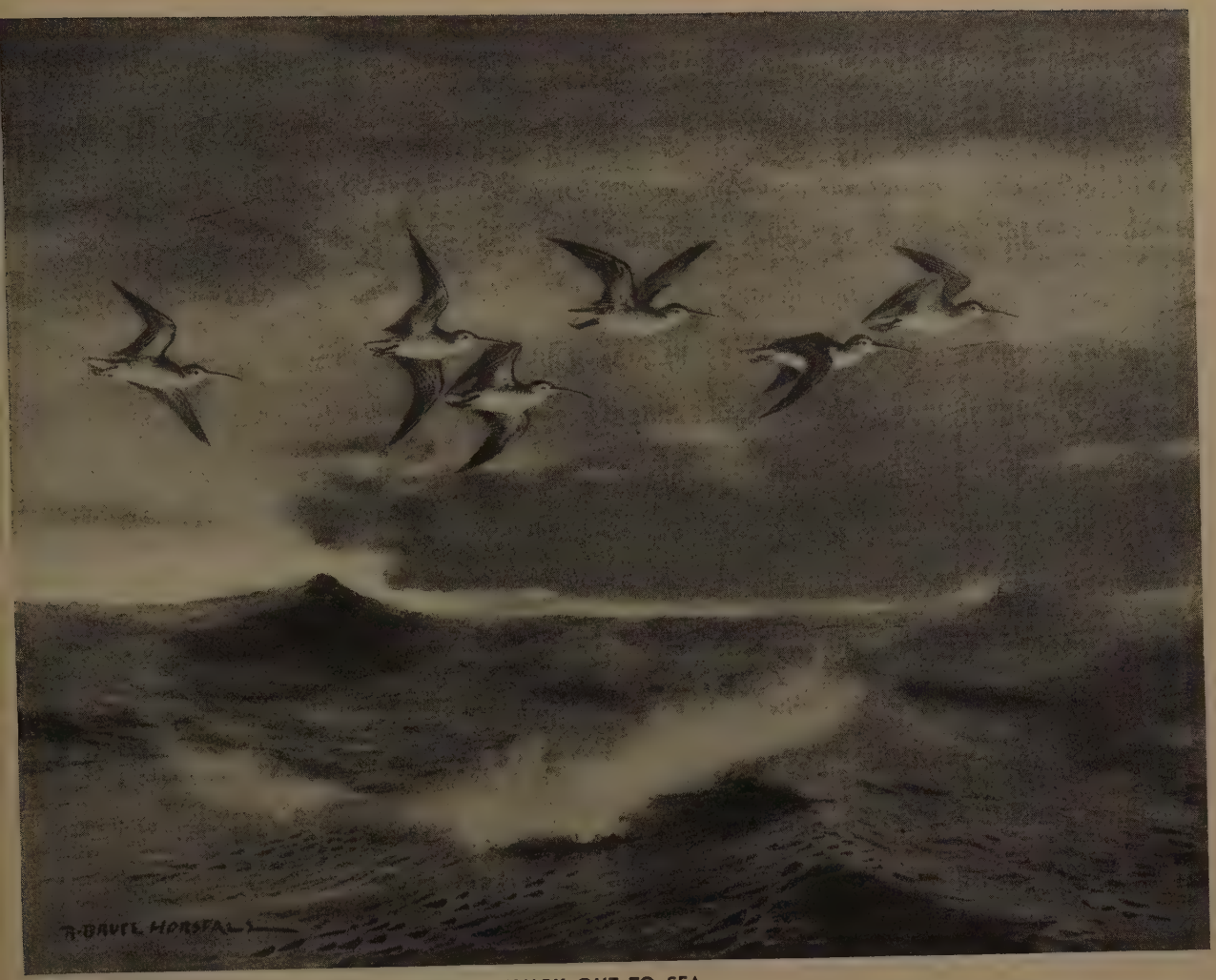
I was standing by an open casement window at the time, idly watching our Scotch terrier who was dining off a juicy meat bone just under the window. Suddenly I saw him pause, lift a forepaw and gaze in a startled way toward the great mountain just back of us. The light over my head flickered out; I was conscious of a queer surge of giddiness. Tam, the Scottie, suddenly dropped his bone, snatched it again and thrust it frantically into a pile of leaves, and was already posting toward the front door when a rumble and swaying and grinding of the house warned us that a bad earthquake was upon us. We all rushed for the open doorway just as a small brindled dog shot in between us as if seeking shelter among his gods.

For what seemed to us minutes the world swayed and rocked and roared about us. We vaguely saw other groups of people running out from the houses down the road; but what came most clearly to our consciousness was the voice of a coyote on the mountainside. Though it was not yet dark, not nearly the hour for his hunting time, he lifted his voice in a long-drawn, unearthly wail that sounded like the very embodiment of wordless fear.

When the unearthly silence that follows great earthquakes fell, our Scottie looked around, eyed us as if asking some light on the treacherous antics of the universe, then went round the house, unearthed his supper and after carrying it hither and yon sat down to a somewhat uneasy enjoyment of it. We saw him stop now and again and look toward Ta-quitz Peak as if he shared the belief of the desert Indians that the god of all earthquakes dwells behind its rocky door. An hour later another hard shock came, and from that time on Tam refused to leave us, lying with his head against a friendly foot, stepping lightly about the room from time to time and licking any hand he could reach.

It brought to our memories the behavior of our collie in the only other bad earthquake we had gone through, that in the San Jacinto valley in 1918. My sister and I were driving with friends across the valley when the shake came, and as soon as we could get our bearings after the shock we started for home as hard as we could, frantic at the thought of father and mother in a house with many chimneys. We were relieved as we came up the drive to see them sitting under an oleander tree, surrounded by a necklace of dogs. There was our own collie Danny, and beside him his arch-enemy Bunk from a neighboring ranch, a fox-terrier and another collie from across the hill, and a little red cocker who lived two miles away. Later we learned that the families of all these refugee pets had been driving that afternoon, and the dogs had sought the only human protection near. How they had divined that my father and mother were at home was the mystery.

That night we all slept on the lawn. There were recurring shakes all night long, and every shake was heralded by the collie's uneasy whines, by the cries of coyotes on the wild hill above the ranch, and by the mourning of wild doves in the cottonwoods overhead. It made a tremendous impression on us all, and for years afterward the mourning cry of the doves or the howl of a wandering coyote could fairly make me live the night of the great earthquake again.



LEAVING INHOSPITABLE SHORES, THE BIRDS STRUCK OUT TO SEA
From Labrador and Newfoundland they flew to the Lesser Antilles, shunning the shore unless blown out of their course by storms that forced them inland to be shot at again

WHILE THERE IS LIFE . . . !

THERE MAY, ALSO, BE HOPE FOR THE ESKIMO CURLEW

BY ALEXANDER SPRUNT, JR.

ILLUSTRATED BY R. BRUCE HORSFALL

THAT there was once a species of bird so numerous in this country that its ranks rivalled those of the famous passenger pigeon, is a fact which may not be widely known. Sadly, reference to the species must be made in the past tense because the Eskimo curlew, once numbered by millions, is barely represented among the creatures of the earth. There are other birds in imminent danger of being exterminated in this present generation, but, desperate as is their condition, there is more hope for them than for this unfortunate victim of man's ruthless power.

The destruction of this curlew is a blot on the sections of the country in which it took place. Approaching the passenger pigeon in abundance, it, also, was destroyed to meet the demand of the market. It was, too, the same problem in addition—ineffective laws, plus many unscrupulous gunners, equalled the destruction. It seems strange that, with so many varied articles of diet easily available, mankind must turn to the lesser animals and wreak havoc in their ranks for a mouthful of meat. The very name of "dough-bird," by which the Eskimo curlew was known in some localities, suggests this gourmand-like spirit, because the term had reference to "an extremely fat, and delicious fowl".

The Eskimo curlew belongs to the large order of shorebirds that contains the snipe, sandpipers, plovers and other waders. It is a counterpart, except in size and a few markings, of the Hudsonian curlew, still abundant in this country today, the latter being by some inches the larger bird. Like most others of the order, this curlew is highly migratory, breeding in the far north, and wintering far south, a much-travelled member of the avian world.

Reaching to, and within, the Arctic Circle, the nesting grounds comprise the Barren Grounds about the large Arctic rivers and the bleak shores of the Polar Sea. Here the curlews make their simple nests and hatch their young, caring for them until late July. Then old and young gather together for the southward flight. Since these great flights will never again be witnessed, we must again speak of the past.

The fall migration of the Eskimo curlew was performed, in the main, over the Atlantic Ocean. Leaving the breeding grounds, they flew southeastward to the coasts of Labrador and Newfoundland, where tens of thousands gathered to feed on berries and other food in preparation for the long ocean trip. Here it was that their troubles began.

The fishermen and natives, ever on the alert for the flocks, made ready for them, and welcomed them with every gun they had to carry. A winter supply was often gathered by salting down the birds by the barrel. This gives some idea of the magnitude of the slaughter. The practice of "night-lighting" was frequently used. This consisted in blinding the birds with torch and lantern as they roosted on the beaches. Guns were too slow in this sort of "sport", stones and sticks being used to mow down the birds in ranks. The day killing was accomplished by shooting into the massed flocks, and as many as two thousand were sometimes killed in a day by two dozen men.

THE ESKIMO CURLEW, VICTIM OF MAN'S INSTINCT TO KILL

The passing of this bird is a blot upon the sections of this country where it was persecuted and shot, perhaps beyond recall

Leaving these inhospitable shores, the surviving birds then struck across the Atlantic, not touching land again until arriving at the Lesser Antilles, unless blown out of the course by storms. When these occurred, they would appear in huge numbers on the New England coast and other points of the Atlantic seaboard.

During these periods of enforced visitation, they had no rest from the ever ready army of gunners. Relentlessly persecuted until the weather permitted resumption of the flight, they would again put to sea, finally reaching South America and proceeding on to winter homes in Brazil and Argentina. Thus the summer and winter ranges were, roughly, seven thousand miles apart—a long voyage. There is little reason to suppose that even there they were safe from harm. Many, doubtless, were killed throughout the winter months by the natives, but the refinements of civilization were not present to an extent that induced the wholesale slaughter effected in this country. The Indians, here, killed pigeons and buffalo, but only as they needed them, and the species did not suffer extinction. It remained for the white man to wipe both out, and he has done practically the same with the curlew.

Now comes the main item in the account against the people of this country. The route of the spring migration was wholly different from that of the fall flight, and it was during the spring that the curlew suffered most. Leaving South America, the birds flew mainly overland,

passing over and by Mexico, reaching the United States across Texas and the mid-western prairie states in such stupendous numbers that they reminded the inhabitants of the passenger pigeon. Indeed, they were known as "prairie pigeon".

It is said that flocks, when alighting, would cover the ground to the extent of fifty acres, and that the flying birds would often obscure the sun. Nebraska and parts of immediately adjoining states were centers of butchery attending these spring flights. Whole communities would turn out in wagons, and shoot the defenseless creatures until the bodies overflowed the conveyances.

Hunters were regularly employed by markets and game dealers. They followed the birds from place to place, studying the routes, catching up with the travelling birds, as they passed them feeding on the prairies. Always easy to approach, remarkably tame and possessing the fatal habit of hovering over wounded companions, the curlews afforded much the same quality of sport as would have been gained in killing cows in a slaughter house. They decoyed easily, and so simple was the procedure that a good shot would leave none of a flock which circled over him.

At the very time the senseless butchery was going on, the birds were performing untold good to the very people who were killing them. They often arrived just as the crops were being planted, and at once resorted to the plowed fields, where they fed upon the many injurious insects which were at work upon the seeds and newly-sprouted grain. The vast numbers of destructive insect pests which these birds consumed can only be imagined. Notable among these was the grasshopper, of which the curlews seemed particularly fond.

The marked decrease in their numbers was first noted about 1875, and they became steadily more scarce, until, in the 'nineties, they had become uncommon. By 1900, the decrease was more advanced, and since that time only scattered flocks and individuals have been reported, or taken. As late as 1927, a very few were reported, so we may hope that some few of the remnant of the once vast host still remain. The migrating flocks of old, however, are gone beyond recall, and no more will their mellow notes be heard above the western prairies.

And what of their future? Many maintain that the living birds are all too few ever to propagate the race, and to bring it back to even a weak foothold. This may be true. But the effort should by all means be made to give at least what few remain a chance to do what they can. Who knows what might be accomplished if public sentiment be aroused, and marshalled into line for their protection? It is a powerful weapon, and can wield a mighty influence.

In the forefront of the fight stands the Federal Migratory Bird Act. Knowledge of this statute, and strict adherence to its dictates, might accomplish the end. But do all know of it? How many of the people of this country know of the struggle which is on foot to give a square deal to our wild life? Ornithologists, conservationists, and others in such work, of course know it, and are in accord with it, but what strides could be made if all who are interested could be made to rally to the cause, by simply putting the facts before them.

It must be told, published abroad, and done again, if the end in view is to be consummated. Too often, little or no notice has been taken of a situation which might have been rectified by a little well-thought-out publicity. Tell others the facts, and results will follow. Enforcement of an absolute closed season, a campaign of education among schools and sportsmen of this country, and the personal bit of every interested party may save the Eskimo curlew. If any are still alive, as there is good reason to suppose, the fight should be kept up as long as one pair of birds still remain to build their grassy home on the arctic tundra, and lead three or four young southward in the fall. There will then remain the chance that these will return to build two more nests next year, and more the next, and we may yet see the curlew in this country again IF—WE PERSEVERE IN OUR FIGHT FOR THEM.

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THE MOSQUITO'S POSE

BY S. F. AARON

THERE is no need to refer to the mental attitude of the sharp-billed, singing and bloody-minded pest. Its position when perched is quite another matter. Though possessing six normal legs the mosquito uses only four for actual support; the posterior and largest pair are invariably free and elevated, protruding far back of the body. There can be and there is no other purpose in this than protection, as may be, largely by chance, observed.

The long antennae, sense organs unsurpassed, and the eyes of the creature may readily discern the approach of an enemy in front or from the sides. An attack from the rear entails another precaution and hence the long legs are stretched back to give a warning when they are but barely touched. Thus we may see a small Drassid spider, or a leaping *Phidippus,* a sharp-jawed ground beetle, a tigerish centipede, a hungry soldier-bug, or a hunting ant make a move at the rear of a perching mosquito and be defeated in the effort at capture by those hind legs, because the wings of *Culex, Aedes* and other tribes are ever ready to repel such flanking tactics.

PHOTOGRAPH BY HOMEIER-CLARK STUDIO

THE LOVELY COLONIAL GARDEN AT YORK HALL IN YORKTOWN, VIRGINIA

Enclosed by a vine-covered brick wall, its ancient Colonial appearance belies its actual youth and seems to prove that old gardens may, in fact, be quickly recreated

FLOWERS OF BY-GONE DAYS

SOME OF THE EARLIER SETTLERS IN COLONIAL GARDENS

BY DOROTHY E. PLETCHER

WHEN the old-fashioned sailing vessels nosed their way in toward American shores in the seventeenth and eighteenth centuries, they brought here flower-loving colonists with innumerable packets of flower seeds from the homeland neatly tucked away with their worldly goods.

What a wealth of fascinating garden history was made back in Colonial days! Perhaps too few of us have read about New England's charming early gardens, established by wealthy merchants whose ships visited the corners of the earth, returning laden with strange new plants. In fact, the "Plymouth Records" reveal the assignment of "Garden-Plotes" laid out in 1620. And we know exactly what flowers were blooming in trim American gardens in 1672, because in that year one John Josselyn published his celebrated "New England's Rarities Discovered," in which he compiled the earliest list of flowers ever made in America.

At New Amsterdam the good Dutch vrouws gardened finely with their bright flowering bulbs. Nearby, in Philadelphia, John Bartram, Pennsylvania farmer and botanist, in 1728 established the first botanic garden in America. And, in the South, the tobacco planters created spacious gardens that were indeed amazing.

Elaborate Colonial gardens boasted of shady flower-lined paths and many box-bordered flower beds, generally four feet wide, divided by narrow walks or "alleys." The Colonial, insistent upon privacy in his garden, placed it at the rear of the house, and planting tall trees and hedges to screen out an inquisitive world, made it an outdoor living room.

Why not draw a plan of our proposed old-time garden? Although most of us must forego the large garden of many beds, we can have a picturesque small garden by first surrounding the rear yard with a hedge or a high fence or a wall—over which we will grow vines or roses. Immediately within our wall, we will plant flowering shrubs, and then arrange a wide flower border encircling the yard, with the tallest flowers in its back row. The next row will be slightly shorter, and so on, until the lowest edge of the border is reached. Our border will surround a lawn, at one end of which there will be the inevitable sundial—or, mayhap, an arbor or "bower."

In selecting flowers of by-gone days, there are two schools of thought—those who wish only the old-fashioned sorts, and those who believe that new hybrids should be included among the old varieties. Strictly Colonial plants, of course, are those which were in use before 1776. Anticipating a constant succession of bloom, the flowers are here introduced in the order of their appearance on the garden scene.

In seeking wall decorations, great-grandmother could

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THE OLD GARDEN AT THE BARRETT WENDELL HOUSE IN PORTSMOUTH, NEW HAMPSHIRE
Coastal New England boasts many gardens that recall those of Colonial days grown from seed brought from the homeland or sent to those in the new country from friends at home

have selected "double wood-bine or honisuckle," yellow or white jasmine, sweet-scented peas, now known as sweet peas, and morning-glories.

The "merrie month of May" saw her shrubberies aglow. Then appeared perhaps the best loved bloom of old gardens, the "laylock" or blue-pipe tree—the lilac, with its charming contemporaries, the rosy flowering almond and the calycanthus, also known as Virginia allspice, sweet shrub and strawberry bush. About three varieties of the common lilac and two forms of the Persian lilac were known. And there were also the barberry, rose of Sharon, the "double white pipe-tree" or mock orange, myrtle, boxwood, smoke tree, oleander—Dolly Madison's favorite—and the guelder rose, the two last mentioned being indigenous to the South and beloved by Southern gardeners.

Doesn't it seem almost inconceivable that Colonial gardeners were unacquainted with spiraeas and deutzias, which came to us in the nineteenth century from Japan? Even the forsythias were unknown here then.

Eighteenth century gardeners depended on having the very back row of their borders in June resplendent with the drooping blood-red foliage of love-lies-bleeding, and columns of *Yucca gloriosa* or Adam's needle. Towering to six feet, and proudly bearing aloft their cream-colored, cup-shaped flowers, the yuccas are frequently likened to shafts of marble against the green hedge.

Here, in July, swaggered forth those three tall stalwart musketeers—sunflower, hollyhock and monkshood. Why not plant yellow and white hollyhocks against our hedges, where, together with the large, intensely blue helmet-shaped flowers of the monkshood, they will draw many an admiring glance? And later, suppose we add Madonna lilies and daisies? Monkshood—aconite or wolf's-bane—regarded by the ancients as a deadly poison, was rubbed on arrowheads by the Greeks in the belief that it would kill wolves.

For the next lower row—three feet high—there were valerian or garden heliotrope, lemon day-lilies, German iris and peonies willing to begin blooming in May. How could one ever bring himself to suspect the spicily fragrant white blossomed heliotrope of having produced for centuries an unpleasant-smelling medicine for the treatment of "histerrick fits"?

There was really quite an array of lilies high in Colonial esteem—the red, Canada, Madonna, Chalcedony, Martagon, and the orange and lemon day-lilies. *Hemerocallis flava,* the lemon day-lily, a great favorite, always seemed happiest when grown in clumps in moist shady places and water margins and fence corners. And how well it looked with the blues and purples in the border, particularly the larkspur! According to John Gerarde, a

AN IVY-COVERED SUNDIAL IN A SETTING OF OLD-FASHIONED LOVELINESS

Candytuft, tulips and irises surround this ornament in the garden of Maxfield in Virginia, where the present owners have restored the flower garden of a by-gone day

sixteenth century English garden writer, the German iris, ranging from blue to white and yellow, was practical as well as showy, for he advised that the root "stamped plaister-wise, doth take away the blewnesse or blacknesse of any stroke." Great-grandmother knew only the evil-scented peonies—*Paeonia officinalis* and *P. peregrina* from Portugal—for alas! the sweet-scented *P. albiflora* and the *P. moutan* had not yet come from China.

June brought to this three-foot group *Delphinium ajacis,* the divinely blue, rose or white larkspur, together with foxgloves and poppies and English iris, probably the oldest iris in cultivation. And why was it that the yellow, white and purple foxgloves, *Digitalis ambigua, D. lanata* and *D. purpurea,* with their spires of beautiful bells, invariably attracted the Canterbury bells and the sweet williams?

Strangely enough, from Queen Elizabeth's time on down, the poppy was heartily disliked. Some complained that its dazzling scarlet caused headaches; others disliked its "evil smell." Then, only the corn and opium poppies were known, and under such names as headache and Joan silver-pin. But where could one find a lovelier picture than that made by gaily nodding poppies "like painted glass," consorting with larkspur and daisies?

Such three-foot beauties as the copper-colored orange day-lilies and the white, yellow and blue lupines—*Lupinus albus, L. luteus* and *L. hirsutus*—were contributed by July. Thoreau always thought that the gloriously blooming lupines fairly "blued the earth." And we agree with him, for what a gladsome thing they make the garden!

The piquant white, blue, purple and red columbine or dove plant, and honesty in May, perhaps the first to appear in the group of flowers averaging two feet in height, were followed there in June by Canterbury bells, bachelor's buttons and chrysanthemums, and in July, by snapdragons and gilliflowers. In late summer came the four o'clocks.

Because of the resemblance of its nectaries to the heads of doves encircling a dish, the columbine received its name from the Latin *columba,* meaning a dove. Honesty, an old-time standby, which was grown principally for its silvery seed pods for winter bouquets, was, said Gerarde, "Penny-floure, Money-floure, Silver-plate, Sattin, and among our women called Honestie."

Canterbury bells were named for the bells borne by pilgrims to the shrine at Canterbury. *Campanula medium,* perhaps the oldest and most popular of the five varieties then in vogue, enlivened the garden for eight weeks with its blue and white bell-shaped flowers. Varying from blue, purple, blush, red, white or mixed colors, *Centaurea cyanus* or bachelor's buttons—in

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AN OLD BOX-BORDERED GARDEN AT "THE LINDENS" IN DANVERS, MASSACHUSETTS

Behind the rows of box there grow flowers, new and old, in a profusion that must have distinguished many of the lovely gardens so carefully nurtured in earlier days

other words, blue bonnets, bluets, ragged sailors, dusty-millers, cornflowers, hawdods, and break-your-spectacles —obligingly bloomed until frost. And so did the naïve little chrysanthemums—four varieties of them. There were *Chrysanthemum parthenium* or feverfew, called "double featherfew" by John Parkinson in his "Paradisus in Sole;" *C. leucanthemum,* the white ox-eye daisy; *C. segetum,* the yellow corn marigold; and *C. coronarium,* a pale yellow bloom.

Those attractive snapdragons, *Antirrhinum majus,* with their varicolored spikes of flowers so oddly formed like a rabbit's mouth, were among the best hardy plants. And the gilliflowers or pinks! Those of our Colonial gardens, rose, white and variegated, were *Dianthus caryophyllus,* from which all our carnations, picotees and cloves came originally. Other pinks were *Dianthus carthusianorum,* the white, pink or red sweet-john, and *Dianthus plumarius,* a Scotch, grass, garden or pheasant's-eye pink which came in white, light red and purple. And isn't it comforting to know that *Mirabilis jalapa,* the red and yellow four o'clocks, alias Marvel of Peru or afternoon ladies, so named because they remain closed until late afternoon, will begin to bloom in late summer and continue until frost?

Dainty snowdrops and crocuses and scillas blithely popped up in the forefront of the border in March, accompanied, of course, by the horned and sweet violets, *Viola cornuta* and *V. odorata,* while April witnessed the entrance here of the tulips and perky daffodils (butter-and-eggs) and jonquils and grape hyacinths and stately crown-imperials. And marching right along with them were those darlings of the garden—pansies, English daisies and primroses.

Today we use our violets exclusively for decoration, but a unique mediaeval recipe called for tansy, feverfew, parsley, and violets mixed with eggs, fried in butter, and sprinkled with sugar!

Early in the eighteenth century the three widely cultivated tulip varieties were Duc Van Thol, Flamboyante and Koning or Kaiser's-Kroon. Of tulips naïvely did Parkinson, the old herbalist, write:

"Tulipase do carry so stately and delightful a form, and do abide so long in their bravery, that there is no Lady or Gentleman of any worth that is not caught with this delight."

Naturally the lovely Polyanthus primroses were greatly admired. And what of the pansies? Appropriately called heart's-ease, the three-colored pansies, *Viola tricolor,* flashed bright little faces of purple and yellow and white or blue. And great must have been their popularity because they accumulated an amazing array of folk names: johnny-jump-up, none-so-pretty, three-faces-under-a-hood, meet-me-at-the-garden-gate—yes, the list is even longer.

The unique gas plant or fraxinella and the tall *Dianthus barbatus,* called London pride or sweet william, named for William the Conqueror, in company with the shorter pinks and candytuft, all made their quaint début

PHOTOGRAPH BY HOMEIER-CLARK STUDIO

THE MARY WASHINGTON KITCHEN AND GARDEN IN FREDERICKSBURG, VIRGINIA

Like a fragrant memory it recalls by-gone gardens in Virginia that vied with those of New England in attempts to reproduce the gardens of England in the new soil

in June in the low-growing section of the border. In the middle of the eighteenth century, the daughter of Linnaeus, the celebrated botanist, brought the gas plant great publicity by setting fire to its surrounding gas without the ignition harming it. For years the versatile candytuft has been making superb edgings. *Iberis umbellata,* with purplish flowers, and *Iberis amara,* a white, were the only varieties in the old gardens.

Then, among the July pigmies, in a breath-taking whirl of loveliness, appeared lobelia, stock gilliflower, catchfly, and love-in-a-mist. It is thought that the China aster, which looked in on the garden scene a little later, in August, was introduced to American gardens in 1735 by John Bartram, the founder of our first botanic garden. It was introduced into Europe from China four years previously.

The long-blooming lobelias, *L. cardinalis* with crimson flowers, and *L. syphilitica* with showy spikes of bright blue flowers, were named for Mathias de Lobel, who was botanist to James I and greatly influenced flower culture in England—an early instance of naming a plant for a person instead of using a descriptive term. "Stock gilliflowers single and double," or *Matthiola incana,* and "bleak blew" love-in-a-mist, *Nigella damascena,* combined very prettily indeed in the front of the border, where undoubtedly Colonial children came seeking the amusing catchfly which has beneath its flowers sticky patches for catching ants.

Aside from boxwood, perhaps nothing could be more pleasing for an edging than the shrubby aromatics which were trimmed to a height of about six inches, with a breadth of four. These were made of herbs, so long depended upon for medicinal and flavoring purposes—thyme, savory, hyssop, sage, lavender, germander, lavender cotton, rue, rosemary and marjoram. Attractive little flowery edgings were made of thrift, daisies, pinks, camomile, catchfly, *Saxifraga umbrosa,* dwarf virgin stocks, pansies and candytuft.

In Colonial days our modern roses were unknown. Their rose array consisted of the York, Lancaster, damask, sweet briar or eglantine, Austrian briar, French, Cherokee, moss, Provence, cabbage, otherwise known as the Provins or hundred-leaved rose, and Scotch roses. In the flourishing old John Quincy Adams garden in Quincy, Massachusetts, the York rose bush that Abigail Adams herself planted there in 1788 is still resolutely blooming! Happily, in 1930, the American Rose Society created an Old Rose Committee for search, preservation and cultivation of old varieties, all of which has inspired the nurserymen to begin propagating old roses.

And so, amid the perfume of rose-covered arbors, why not retreat from the perplexities of this scurrying age? Never, in the history of the world, have people lived as charmingly as did those of eighteenth century America. With family life centered about their flower gardens, life was indeed an enjoyable affair. Why don't we plant a profusion of Colonial flowers—the kind our great-grandmothers loved to putter over—and relax amid them?

UNDISMAYED BY THE STRAW MAN

The birds learned to come to this somewhat fearsome fellow without fear of disaster

THEY ACCEPT A HUMAN SUBSTITUTE

They transferred their confidence in the straw man to the author, as is seen here

MAKING BIRD FRIENDS

TEST OF PATIENCE WITH THE RICHEST OF REWARDS

BY FRED E. BROOKS

PHOTOGRAPHS BY THE AUTHOR

INTIMACY with wild birds, like habit, usually comes about by slow degrees. To have a dainty sparrow or thrush that is free to wing its way through all the outdoors alight by choice close to your hand or face is a thrilling experience. And to have such a bird scrutinize you at close range and then flit confidently to your hat or hand or pipe is an exciting adventure. I like the sensation imparted by a bird's foot clasped around my finger. The thrill runs up my arm and tingles through the back of my neck and chases up and down my spine. I lose interest in my shotgun and consider how tame by comparison has been the kick which in times past I have gotten out of shooting wild creatures. The confiding trust of such a charming little wisp of life satisfies that sense of egotism which men have and which prompts them secretly to brag to their wives about the ease with which they can win friends.

Long after I became an enthusiastic admirer of wild birds, I still took with a grain of salt the stories sometimes heard about persons who could go outdoors and charm the birds down from the treetops and out of the thickets to perch upon their hands. I associated such stories with tales of locating underground streams of water with a forked dogwood stick, or of wooing good luck with the left hind-foot of a graveyard rabbit. The birds did not come to me, although every summer I provided comfortable nesting-places for numerous families and fed scores of them through the winter. In spite of all my kindness they were afraid of me and would fly away whenever I approached.

But now, at the very moment when I am writing this, I can go out into my backyard, extend my hand with nut meats in my palm, and chickadees, Carolina wrens and titmice will come fearlessly, settle upon my fingers and take the food. There is no charm about it. I have simply convinced the birds by degrees that I am their friend; that I have scrapped my armament, outlawed war and want to promote understanding and good will with them.

Birds naturally like human society. They gather about our homes and love to build their nests in the vines of the porch and eat crumbs at the kitchen door. They are always much more numerous about our lawns and gardens than in remote fields and woods. And yet birds are deathly afraid of our close approach. They fear us more than they do a horse or cow, or any other large animal. Their distrust of us is justified because through the centuries and in spite of their innocence and beauty and usefulness, we have trapped, shot and slaughtered them in uncounted thousands.

I shall never forget the time when I first overcame this distrust and felt the thrill of having a wild bird perch upon my hand. I induced it to do so by a little harmless deception. Just outside a window of my library I erected a feeding shelf for the birds, attaching one side of the shelf to the window sill. The shelf was bountifully

supplied with cracked grain, sunflower seeds, nut meats, cracklings and other dainties. The time was winter, when the natural supply of bird food in fields and forests was scant. Within a few minutes the birds found their shelf and the news soon spread throughout all the bird community that a supply ship from some heavenly port had wrecked and spilled its cargo at my window. They gave me no credit at all. I could sit within and watch them through the glass, but they resented my nearness and made eyes at me and wagged their tongues at me.

Then one day I made an artificial arm from a crooked limb of a tree, slipped an old coat-sleeve over it and placed a glove on the hand. I thrust this arm out of the window, allowing the hand to extend beyond the edge of the feeding shelf. On the palm of the glove I placed a little heap of walnut meats, and then, like Br'er Rabbit, watched to see what the news is gwine t' be.

At first not a bird came near. A tufted titmouse perched among the shrubs and screamed—*smarty! smarty! smarty!* A pair of wrens growled and chuckled and nuthatches and sparrows flew around at a safe distance and whistled their suspicions. But they soon grew hungry and tired of their outcry and a chickadee ventured to the shelf, eyed the tempting food on the glove, hopped over and took a fat kernel and flew away. This made all the watchers bold and in a very brief time they were taking the food as fast as I would supply it.

Then I removed the dummy arm, put the glove on my own hand, and holding a supply of nut meats thrust my arm out of the window. Within a few minutes the birds were coming to my hand in rapid succession. Then I removed the glove and placed the food in my bare palm. The birds were suspicious, but again a chickadee led the way, and, while he grabbed a mouthful, momentarily clasped my thumb with his cold little toes. The mob soon followed; downy woodpeckers, titmice, juncos, wrens and nuthatches. They even quarreled among themselves for a place on my hand. In my excitement I forgot all other work and allowed my lunch-time coffee to get cold. Thereafter whenever I held tempting food out of the window the birds were sure to come for it.

After I had given the birds many lessons in feeding from my hand at the window I tried standing outside with my body fully exposed while I offered them food near the shelf. But coming to my hand now was too much to expect of them. Their hereditary fear could not be so readily overcome. I might have a trap or a gun which would suddenly spring or explode. They very properly let me stand until I became cold and tired.

THE TITMOUSE TAKES A NUT MEAT

(Below) A dummy hand was used to win confidence until a real hand was accepted with equal confidence

Then I carried forward the dummy experiment another step. I made a scarecrow sort of a man, stuffed his head, arms and chest with straw, made the expression of his face and his general contour to resemble my own as much as possible and set him up in my backyard. The winds blew and the storms came and beat upon him, but he did not get cold feet or fall, for he had no feet and he was founded upon a locust post. I put nut meats upon the crown of his hat and in the palm of his hand and then fitted a corn-cob pipe in his mouth and filled it with dainties. The dummy had the patience of Job and he stood until darkness fell, but not a bird came near him. Through the night and the tempest he kept his place, offering his food in vain to the long-departed whip-poor-wills and night-hawks.

At daybreak the next morning I arose and looked out of the window. A cardinal was sitting on the dummy's hat, a white-breasted nuthatch was hitching itself around on his arm and hand and the pipe was empty. Throughout the day I kept all the depressions about the person of that straw man filled with the choicest titbits, and the birds swarmed about the food confidently and unafraid.

A day or two later I removed the dummy, loaded up with nut meats myself, and stood like Casabianca in the exact spot which the dummy had occupied. Nor did I have to wait long for the birds. They were shy at first, but soon began venturing to me, taking the food from

THE HAT OF THE STRAW MAN HELD FOOD
In fact the birds discovered that he was a complete cafeteria, even to the corncob pipe

HE MOVES, BUT THERE IS STILL FOOD
Soon the birds would explore all about the author in search of food, even in his pockets

my hat, pipe and hand and even exploring my pockets. I set up my camera and made numerous pictures. While a bird was perched upon one hand I would operate the shutter of my lens with the other. They became so fearless that while I was obtaining a proper focus of the instrument they would alight on my hat, or settle in front of my lens obstructing the view so that I would have to shoo them away.

I have found that in any flock of a given species there are likely to be one or two individuals that are less suspicious of me than the others, and that when these become tame they help to inspire confidence in their fellows. Once hand-tamed, they usually remain on intimate terms with their tamer for some time. After being absent for several days I have returned and offered them food in my hand, when apparently the same individuals that had been accustomed to come to me would appear and without any hesitation take the food.

I usually offer the birds nut meats in my hand. They like nuts in winter better than any other food. When I hold out cracked corn to them they will frequently throw it to the ground a grain at a time without swallowing any of it. Their individualities and happy dispositions are a continual surprise and delight, and in a hundred ways they repay me for my overtures of peace and good will. I have found at least one way to make birds come to me.

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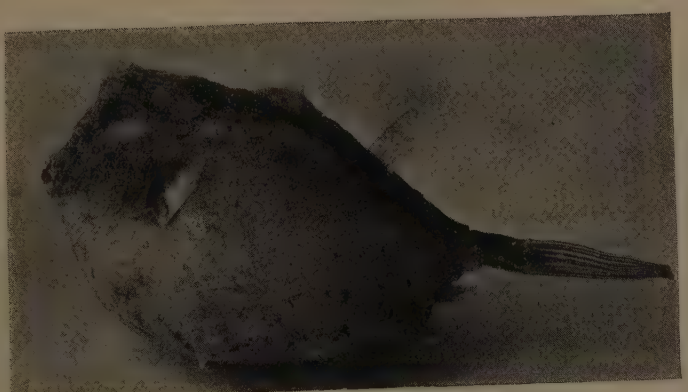
THE COWFISH STRAYS FROM HOME BY HOWARD R. HILL

IT IS a long way from Japan to Southern California but not too far for the sturdy little cowfish. Numerous specimens of this curious armor-plated fish have recently been caught or cast upon beaches near Los Angeles. No one has yet been able to explain their presence here, thousands of miles from their native home in Japanese waters. It seems all the more remarkable when one takes into consideration its habit of living near the bottom in shallow water and its slow movement.



THE COWFISH FROM JAPANESE WATERS
One of the curious fishes as preserved for public gaze in the Los Angeles museum

There are many different kinds of cowfishes and nearly all of them live in tropical waters. Sometimes they are known as boxfishes because their bodies are enclosed in a tough, box-like shell which is called a carapace. The carapace serves as a protection and is covered with six-sided, bony plates which give the fish a mottled appearance. The tail is without scales and extends out through an opening at the posterior end. Spines are attached at several places on the sides and above each eye. The latter are sometimes elongated and remind one of the horns of a cow. Thus the fish has been named the cowfish.

CAPRI SANCTUARIO

THE NEW ITALIAN BIRD SANCTUARY

BY HENRY McKEEN, JR.

IN Capri there lives a benefactor, a monument to whom will survive long after his fame as doctor and author may, perhaps, be forgotten. This man is Dr. Axel Munthe, a native Swede, a naturalized Englishman, an inhabitant of Capri for many years, the author of the fascinating "Story of San Michele." In that volume one may read of early struggles and adventures, and the final achievement of a boyhood desire; of animal pets in Capri and elsewhere; of great psychic power and animal understanding; and the final return to yearned-for Capri. The chapters on his household pets—Billy the baboon, Amanda the centenarian turtle, and the many others—will entertain pet-lovers. The description of decoying migrating birds by the song of captive blinded quail, and the yearly slaughter of tens of thousands of visiting birds for shipment to mainland markets, will make one's blood boil with indignation.

Some years ago Dr. Munthe bought the entire mountain on which perches Castello Barbarossa to make it his private feathered sanctuary, saving thereby uncounted songsters who have rested there. For many years past he has been using every effort within his means to have Capri set apart by the Italian Government as a bird sanctuary.

My wife and I have visited this charming isle for short stays several times. This time we came for two weeks. Six weeks later we were figuring what part of planned future itinerary we could omit to stay on longer. As animal lovers and Capri lovers, and especially after reading "San Michele", we were most anxious to see the famous villa and chapel, and perhaps the author too. Our obliging hotel proprietor had grave doubts. "Senore Doctor is shy and retiring; he is not very well; he lives now in another of his properties, the Villa Margherita, beyond Anacapri, away from glare and many tourists. Perhaps into San Michele—who knows?—but to see the Signore—surely not."

And so we wrote the Doctor and told him of our animal pets, of our interest in his book and of his home, San Michele, and begged an opportunity to see both it and him.

Two days after dispatch of our hopeful letter, Proprietor Pagano, the concierge, and the pop-eyed bell boy rushed to our room and called us from our sunny porch. "Senore, the doctor himself," they cried in English, French and Italian. Upon descending to the garden I was greeted by a tall and distinguished gentleman wearing a broad black felt hat, his overcoat buttoned over his shoulders like a military cape. A surgeon's fingers, long and sensitive, grasped my hand in greeting. A fine face was his, with clipped white beard and sandy moustache, a distinguished and scholarly brow. We chatted pleasantly for a little time. He explaining that he had taken this opportunity, while in Capri Village on business, to take his morning stroll and answer our note in person. As he left his last words, in slightly-accented, clipped English, were:

"As great animal lovers I am pleased to make you acquainted of an act which makes me happy, the final result of thirty years of effort. Two days ago I have received from Rome advices soon of a Royal Decree which will make hereafter of Capri for all times a bird sanctuary. I am happy for the countless birds which will be saved. Now I must go—the caretaker at San Michele will welcome you at any time."

So, next day, we started for lovely San Michele, a thousand feet above the azure sea, facing smoking Vesuvius across the bay, Monte Tiberio in Capri and Cap Minerva on the Sorrentine peninsula due east, to the south and west Capodi Monte, the Doctor's private mountain sanctuary. We bargained as usual with the cabman, and, finally, were on (Continued on page 256)

IS THIS A BIT OF WITHERED TWIG STUCK AGAINST THE BARK?
With thorns and odd shaped leaves it seems a piece of cactus, but it is one of the insects known as phasmids and found in New Guinea

MIMES OF THE INSECT DRAMA

BY DR. W. RAMME

PHOTOGRAPHS BY THE AUTHOR

MIMICRY in Nature is a subject of endless fascination. It supplies the basis of much argument on the evolution of different groups and their adaptation to their surroundings to the degree that they merge with them and are thus protected. Certainly in the insect world we find ample proof that this adaptation has brought about protective formations which are most successful in preserving many members of a group against extermination by birds and reptiles and other insect eaters out for a hearty meal.

Among the cicadas and the locusts, all over the world, we find outstanding cases of mimicry. Born to the life of an insect, many members of these groups play rôles in the world of flora. They are endowed with a positive genius for becoming, when the need arises, a sere and brown leaf, a green and lively leaf, a twig of withered cactus, a thorn upon a stem or seemingly a part of the very bush or tree itself.

On these pages are shown several of these interesting insects, native to different parts of the world, whose formation has been amazingly adapted to the flora of these regions. It takes but little imagination to picture them clinging to the stem of a twig or alight on a bush to realize how difficult it would be to separate insect from surrounding foliage.

A VERSATILE INSECT ACTOR
This South American cicada makes out well in the part of a thorn

While naturalists of different schools may argue as to whether purpose or chance led these creatures so to resemble their surroundings, or why some particular species need the help that seems to be theirs more than those that must get along without it, most people are content merely to marvel at the resemblance.

These illustrations were made with the same equipment that was used to produce the pictures of insect faces, published also in NATURE MAGAZINE. The subjects are in the Zoological Museum of the University of Berlin and were photographed with a microphotographic camera. Daylight from above and one side was used for light and the pictures were taken with the narrowest camera diaphragm.

A LOCUST FROM WEST AFRICA TAKES THE GUISE OF A WITHERED LEAF

Here its outline is revealed, but to photograph it amongst the leaves where it hides would be to produce a picture of nothing but leaves

THIS SOUTH AMERICAN LOCUST EASILY PASSES FOR A TREE LEAF

While its relative below adds a touch to its leaf-like formation by having thorns on its legs the better to carry out its leafy mimicry

THE BIGGEST LOCUST UNDER THE SUN

This native of New Guinea possesses wing cases that pass in the jungle surroundings for fresh green leaves. All that is necessary is a bit of quiet and you will probably pick him along with the branch of the tree

WHICH IS TWIG AND WHICH INSECT?

In a bush it is hard to tell, and Nature has equipped this East African "devil's flower" with a body that fools wandering insects and lets them come too close to the raptorial forelegs ever ready to seize an insect meal

A GRASSHOPPER OR A LEAF?

This insect from the Philippine Islands has a fantastically enlarged prothorax and its color and formation give it the protective appearance of a dried leaf. Still there seems to be a rather wise gleam in its eye

PROPER FOOTWEAR FOR THE TRIP IN THE ROCKIES IS IMPORTANT

Strong moccasin type shoes equipped with leather soles and hobs are good for walking, and the cowboy riding boots with not too high heels are most comfortable when one is in the saddle

PLANNING FOR THE TRAIL

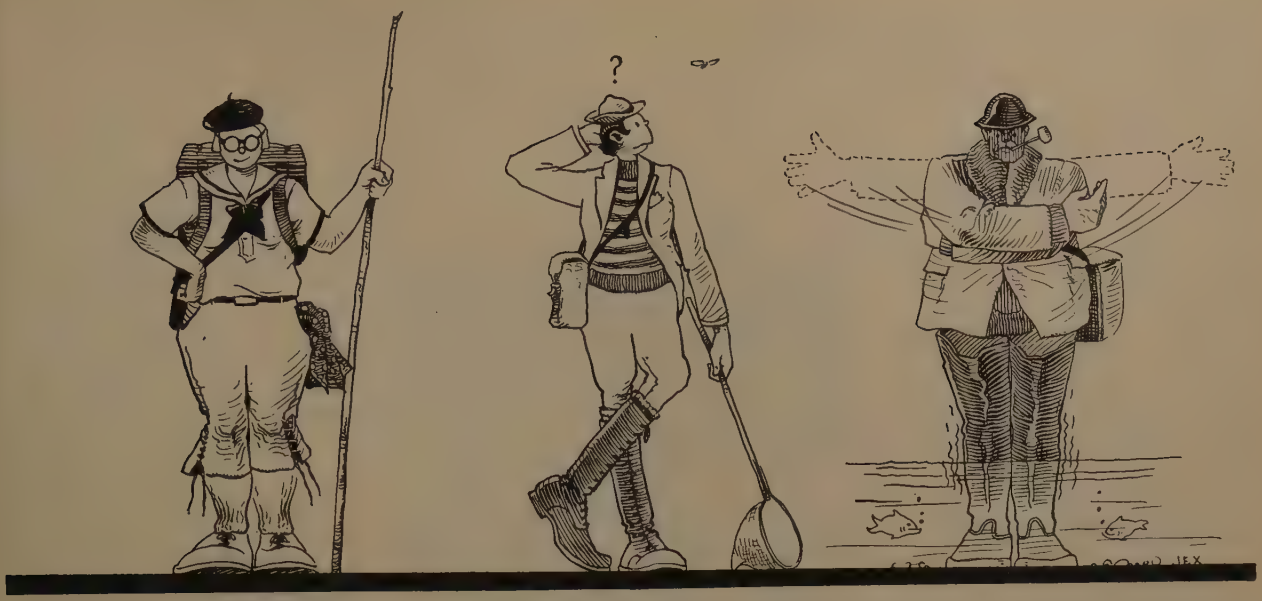
SOME TIPS ON A CAMPING OUTFIT FOR THE NORTHERN ROCKIES

BY ELEANOR B. AND ARTHUR NEWTON PACK

TO REACH the wilderness of the northern Rocky Mountains there is only one practicable way, and that is with pack horses. One may, of course, go on foot himself, but much of the fascinating back country offers no means to replenish supplies, and the traveler must depend upon bringing with him everything he will need. This article is not written for the amateur camper who believes in making himself as uncomfortable as possible, in order to make sure that he is really roughing it. There is no reason why the experienced camper should not be practically as comfortable on the trail as at home, and there is just as much satisfaction in trying to accomplish that end as in boasting of unnecessary hardships. In a previous article we have discussed the question of tents and camp beds and evolved an outfit suitable for many purposes. Such an outfit is readily adaptable to the Northern Rockies. We need only to remember that although good weather is ordinarily to be expected during July and August, storms frequently do occur and some seasons are exceptionally wet. During the fall season both rain and snow may be expected. The country is mostly well timbered with pine, spruce, and fir, and natural tent poles are easily obtained, but, nevertheless, a wider choice of camp sites and tent locations becomes available with the collapsible metal poles or tent stakes previously recommended. The time and labor consumed in camp making are also very much shortened.

We may expect frost on clear nights in the higher altitudes, even in mid-summer after a warm day. Our light sleeping robes, recommended in the previous article, should be supplemented with one or two extra blankets apiece; or, instead of the lighter weight eiderdown sleeping robe, we may use the heavier weight, so-called Arctic. As pointed out in the previous article, however, one heavy-weight sleeping robe is less adaptable to changes in temperature than two light robes or a light robe with extra blankets.

With these brief suggestions referring to our previous article on tents and sleeping bags, we may now consider the subject of clothing and personal outfits. The professional guide or woodsman usually has no special camp clothing. He simply wears his old work clothes, probably with pants of blue jean overall material and a jumper coat of the same. If he has any other trousers, they were probably once his Sunday-go-to-meeting best which have now been relegated to everyday use. In the choice of clothing for any camping trip, one may well take advantage of the comfort of old clothes. Most campers seem to run to riding breeches and boots purchased for the occasion. Women campers sometimes wear riding breeches with stockings inside and low shoes. Such an outfit for women is both very sloppy in appearance and uncomfortable. Riding breeches are uncomfortable to many people who are not accustomed to wearing them. They seem to bind at the knees. High boots are heavy and greatly increase the labor of walking. Most people



MANY A SAD MOMENT WILL BE SPENT WITH IMPROPER FOOTWEAR

High boots have little use and are a heavy burden when one is hiking or climbing. High rubber boots may be the only ones that will keep feet dry but they are cold and clammy or else they make the feet perspire so that they are wet anyway

Experience is thoroughly demonstrated to be the best teacher and it is on wide, long and varied experience that Mr. and Mrs. Pack base this article and others in this group. There will also be published in this series articles by Francis P. Farquhar, vice-president of the Sierra Club, and Fay Welch, an authority on camping in the East. It is planned eventually to gather these articles in a helpful booklet. In the meantime the Camping Editor of Nature Magazine will be glad to advise you.

wear them for camping because they believe in the waterproof foot-covering theory. For wading streams and for regular use in wet snow or very stormy weather, no boots but rubber boots are really waterproof, and rubber boots have the disadvantage of being cold as well as heavy. If one walks about in rubber boots which are really waterproof without having cold feet, then the feet perspire and become wet anyhow. Breeches and boots or breeches with leggings have an advantage in walking through brush where ordinary long trousers would be torn, but there the advantage stops. Wet feet will not cause one to catch cold when camping, because one is generally exercising, and wet shoes and socks may be changed at camp. One need not wear high boots for protection against snakes, for there are no dangerous snakes in the high mountains. There are no laundries either, and on extended trips one will probably have to do his own washing.

For walking and general use one pair of strong moccasin type shoes just high enough to cover the ankle bone or perhaps ten inches high, if preferred, with leather soles and hobnails, will serve very well. Women will ordinarily prefer the lightest moccasin type shoe without the extra weight of hobnails, and the height to just cover the ankle bone, also. These shoes should be kept oiled and, therefore, resistant to all ordinary dampness. Such shoes may be purchased at prices ranging from $3.00 up, from mail order concerns or one's favorite sporting goods dealer. The shoes should be of a size large enough to fit properly over two pairs of woolen socks—one light-weight wool and one heavier knit pair.

For riding, we may recommend a pair of western type cowboy riding boots of the type made with comparatively low heels. These boots slip on and off very easily, as eastern boots do not. They do not bind or constrict the leg. They are light. The arrangement of heel is the most comfortable for riding in western stirrups. They have loose tops about twelve inches high and are worn either inside or outside the trousers. They do not give support to the ankle and are not recommended for much rough walking. Such boots may be purchased by mail from N. Porter, Phoenix, Arizona, for about $10.00 a pair. They are suitable for either men or women. They should fit over one pair of woolen socks.

For wear about camp, and as a change from either of the above to rest the feet, each person should take a pair of old comfortable rubber-soled shoes or light canvas-topped tennis shoes, either high or low.

For a camping trip of two weeks or more, it is a good idea to have, all together, about six or seven pairs of woolen socks. For foot comfort, two pairs of socks should be worn under the walking boots, which should be of a size sufficient for this purpose. The under pair should be of light wool, preferably white or the natural unbleached color which will be safer in event of any possible blister or injury to the foot, because colored

dyes sometimes include a poisonous element. The outer pair should be heavier knit wool, but very thick, fleece-lined socks will not be needed during the summer time. Each person will need about three or four pairs of the light wool socks, which will also be worn under the western riding boots and with the old shoes to wear around camp, and about three pairs of the heavier wool socks. One pair of long wool socks, reaching to the knees, are good to wear on cold nights to keep the feet and lower limbs warm in bed. Women may prefer to wear old woolen sport stockings in place of the under pair of socks.

The best all-round trousers for men or women for camping in the summer time are long blue jeans which may be purchased from any of the mail order houses. They should be bought a size too large and washed once at home before being taken into the field, to get them into a soft and comfortable condition. For colder weather the man may wear any pair of old wool long trousers which are comfortable or buy a pair from a mail order house. The woman may purchase by mail from C. C. Filson & Company, Seattle, Washington, a good pair of long trousers designed for women and made of water-resistant, greenish-brown forestry cloth. Similar trousers for women may be purchased at Abercrombie & Fitch Company, New York, or von Lengerke & Antoine, Chicago, and other camping outfitters. If breeches are preferred, good breeches for men or women are sold by the sporting goods houses above mentioned.

Most of the time during July and August in the Rocky Mountains cotton shirts give sufficient warmth, especially when worn over woolen underwear, as mentioned below. Furthermore, cotton is easier to wash than wool. Each man or woman will need about three men's cotton shirts (and this is a good way to wear out old shirts frayed at the collars and cuffs). Women prefer bright colored shirts such as may be purchased by mail from N. Porter, Phoenix, Arizona, at $1.75 each. The same concern makes a black and white checked shirt with black collar and cuffs, which does not show the dirt and continues to look well longer than any light colored shirt. These are sold at about $1.00 each.

For a coat or an outside woolen shirt to be worn over the cotton shirt, the so-called cruiser's coat-shirt is recommended. This is worn outside the trousers, not tucked in, and has four pockets in front and one very large pocket in the rear. Such shirts may be purchased from the sporting goods dealers above mentioned and are variously priced in their catalogs, which may be had on request. Women may prefer fancy patterns. Women may also wish to take along a couple of extra woolen shirts or polo shirts for a change of costume, but will continue to wear them outside the cotton shirts to avoid having to do extra laundry.

WELL DRESSED FOR THE TRAIL
This is the outfit Mrs. Arthur Pack finds the most comfortable and practical for roughing it

Woolen underwear is desirable for almost all camping because it absorbs perspiration and dampness and protects against chills and catching cold. Light woolen underwear is not too warm for a summer pack trip in the Northern Rockies. It should be purchased in the two-piece style because separate pieces are easier to wash and permit more convenient changing if only the bottom or top half becomes wet. It is advisable to buy good quality underwear, as one will have less trouble with buttons, shrinking, and so forth. Each person will require three shirts, preferably with half-length sleeves, so as not to get in the way, and three pairs of full-length drawers. The lightest weight is adequate for summer use, but for hunting trips in the late fall a heavier weight is desirable. Many women believe that they can not be comfortable in woolen underwear, but they will find that when living out-of-doors light-weight wool or silk and wool is perfectly comfortable. No amount of outer clothing will give the same protection as woolen underwear, and there is no better insurance against chills and colds, when living in the open. For trips during the fall a heavier weight of woolen underwear will be needed.

These offer the best means of getting extra warmth, but there is more real warmth in a woolen knit sweater than in a leather coat, provided that a wind-break, as will be mentioned later, is worn outside it. Each person

should have one light-weight, long-sleeved, woolen sweater, preferably of the slip-over variety, as there are no buttons to come off and the slip-over gives better protection. In addition to a light-weight woolen sweater, each person should take one heavier knit sweater for occasional cold days and evenings, or a leather jacket.

Heavy and bulky mackinaws are not necessary if each person will take an effective wind-break. Perhaps the best wind-break is a garment called a parka, borrowed from the Eskimos. So-called summer parkas are manufactured by C. C. Filson, Seattle, and sell for about $6.00 each. These are light, waterproof, and absolutely wind-proof garments of treated cloth, which slip over the head, as every good wind-break should. The parka reaches to the knees and has a hood which keeps the wind and rain out of the back of the neck. Its weight and bulk are negligible. With the parka one may also dispense with the bulky and easily torn oiled-skin slicker. Slickers often blow open in a storm at just the wrong time. Furthermore, if a rider once dismounts, his saddle becomes soaked and a slicker gives no protection to the seat of his trousers. It is better to carry tied behind the saddle, for emergency use, the parka above mentioned, and with it a pair of light, oiled-silk over-trousers, such as may be purchased from C. C. Filson, Seattle, or L. L. Bean, Freeport, Maine, at a cost of $5.00 or $6.00. The ankle-length oiled-silk trousers will keep the water out of the boots, when one is riding. Bean also makes a rain shirt similar to the parka but without the hood.

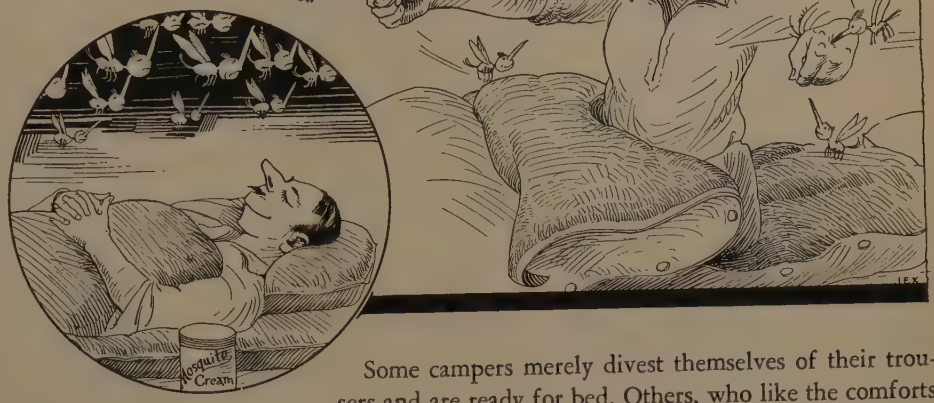
A good wide-brimmed felt hat or Stetson is most desirable because the brim shades the eyes and neck from sunburn and showers. One can drink out of the brim, too. If a western type, wide-brimmed hat can not be purchased locally, it can be ordered by mail from N. Porter, Phoenix, Arizona. For wear around camp, women like a beret in some bright color, and this little woolen cap also makes an excellent sleeping cap or night-cap for both men and women. It pulls down over head and ears and keeps off any night breeze.

A bandanna, preferably of silk, should be part of everyone's outfit. It is handy for keeping mosquitoes and flies off one's neck, as a protection against dust, and so forth. A silk bandanna tied around the hair offers practical advantages to any woman.

For packing or unpacking, handling ropes, and even for riding on cold days a pair of gloves is indispensable. One can buy soft horsehide, semi-gauntlet gloves very reasonably from one of the mail order houses.

TWO WAYS TO SPEND A NIGHT IN CAMP

Don't forget to have along some cream to be smeared on the face and to deter hungry insects



Some campers merely divest themselves of their trousers and are ready for bed. Others, who like the comforts of home—to which they are most certainly entitled—find soft flannel pajamas the thing. Add to this outfit the beret or knitted woolen skull cap for the head and a pair of long, soft woolen socks for the feet, and one is ready for a cold night.

Some persons carry their toilet articles in a roll, but for rough camping and packing with horses it is better to have a stiff leather toilet kit, such as the Hamley Kit, manufactured by Hamley & Company, Pendleton, Oregon. Tooth paste, shaving cream or face cream should be carried in jars rather than in tubes, as the shaking of horse travel soon punctures a tube and makes a very disagreeable mess. Do not neglect a good supply of cold cream or face cream for sun and wind burn. The toilet kit should contain brush, comb, tooth paste or powder, shaving outfit for men, face cream, a cake of soap in a soap box, and a small mirror. A good type of mirror is a small steel mirror which comes in a canvas case and may be purchased from most of the outfitters above mentioned. Each person will need one or two towels of the bath-towel variety, such as may be purchased in any five-and-ten-cent store. Each person may also take his own folding rubber wash basin.

There are numerous miscellaneous articles which should not be forgotten. Be sure to have a pair of dark glasses. If one wears glasses regularly, it is generally possible to have dark glasses made in one's regular prescription. Each camper should carry matches for emergency use in a waterproof match safe, such as may be procured from sporting goods houses. Everyone should have a good pocket knife and a compass. If you don't expect to get lost, at least the compass will be handy in telling you which direction you are going. A folding, pocket rubber cup is always handy. If you don't have a light pair of field-glasses yourself, you will always be borrowing someone else's. Mosquito and fly dope will come in handy. One of the best all-round insect repellents readily procurable is Flit Cream, made by the manufacturers of Flit, and purchasable at almost any drug store. It looks like a white vanishing

cream and has no perceptible odor. It does not keep the insects away, but it will prevent them from biting. It can be safely applied to every portion of the anatomy, except around the eyes and over scratches or abrasions. Most fly dope comes in tubes, but one should purchase a screw-top jar and squeeze out the contents of the tube into the jar, so that the tube will not become perforated and make a mess. A mosquito-proof head net may also prove desirable, and can be obtained from Filson's, Abercrombie's, and other outfitters. Toilet paper can be bought in small packages to fit the pocket. A good first-aid kit should be taken. It is a good idea for each person to take his own, consisting of two or three rolls of bandage, a roll of adhesive tape, and some of the little sterilized gauze pads which come with adhesive tape attached, all ready to put over small cuts and abrasions. Every first-aid kit should include a small bottle of iodine. Iodine burns and has its disadvantages, but no single equally effective substitute has ever been devised. To avoid having the cork come out of the iodine bottle, buy from the drug store a bottle mailing tube with screw top. In such a mailing tube any bottle can be thrown around without possible injury, and the screw top holds the cork in. Other liquid medicines or remedies should be carried in the same way. The emergency kit should include a small, screw-top jar of burn emollient, such as Unguentine. This comes ordinarily in a tube, but the tube should be squeezed out into a jar. Small boxes of pills and other home remedies can be carried in the leather toilet kit. A small pocket flashlight should be equally a part of every person's kit. A large one isn't necessary, and one of the most practical designs is the small, square, lamp-type which can be hung up in the tent. For a trip of any considerable duration extra batteries should be taken. During July and August in the northern mountains the evenings are long, and artificial illumination will not be needed to any great extent. Carry at all times in the pocket a cold-cream lipstick. The sun and dry winds of the mountains are almost sure to chap the lips sooner or later, and even if you never used a lipstick before, you will want one on the trail.

An ax or hatchet for each person is not indispensable, but a small safety hatchet will come in handy, if you help pitch camp or drive tent pegs. Be sure that there is at least one good, man's-size ax in the outfit for cutting firewood.

Beds, tents, cooking utensils, food—everything has to be carried on horses. In this article we shall assume that the packing is to be left to the guide or guides, but one can greatly simplify the procedure and prevent a lot of delay on the trail by having the stuff all packed in the proper type of container. There are two types of packs—a side pack which may be a wooden box or a canvas or leather container called a kyack or alforja, and a top pack which may be anything at all which is not too bulky. Two side packs go on each horse and then generally one or two bundles on top. Tightly packed round duffel bags or any very tightly packed round bags should be avoided. It is very difficult for even the most expert packer to make them stay on a horse. The best way all around, for those who can afford to do so, is to take one's own pack sacks or kyacks in pairs. The dimensions of a pack sack or kyack are generally about 24 inches by 17 inches by 8 inches. They may be procured from such outfitting concerns as the Denver Tent and Awning Company, Denver, Colorado; N. Porter, Phoenix, Arizona; Abercrombie & Fitch Company, New York; or von Lengerke & Antoine, Chicago, as well as other outfitters, and cost from $14.00 a pair upwards. All of one's personal extra outfit will ordinarily go into one kyack, but if one is taking cameras and other things as well, then each person may have a pair. Don't just throw your clothing into such a container, but have some cloth bags marked on the outside, "Shirts", "Underwear", "Socks", "Soiled Clothes", and so forth. If you do this, you won't always have to be fishing down into the bottom of the bag for the article you want or for the odd sock. Bed rolls and blankets may go into duffel bags about 36 inches long and not more than 12 inches in diameter, if not too tightly packed. A pair of these will fit on top of the pack boxes or kyacks when the guide does the packing. Remember, however, that, if you are packing your own boxes or kyacks, each box making up a pair must weigh approximately the same, so that all the weight won't be on one side of the horse. Do your best to even things up. A good way to plan is to have one small duffel bag to be carried on top of each kyack and so arrange your baggage as to come out with an even number of pieces for the party. The outfitter who supplies the horses supplies the pack saddles, pack ropes and canvas pack covers. He will also supply pack boxes or kyacks, if you do not have them and do not wish to go to the trouble and expense of buying them or making them yourself. But even in this event, avoid any large bulky packs which will not fit into containers of the sizes above mentioned, for everything you have on earth, that counts, must be packed on the horse every day.

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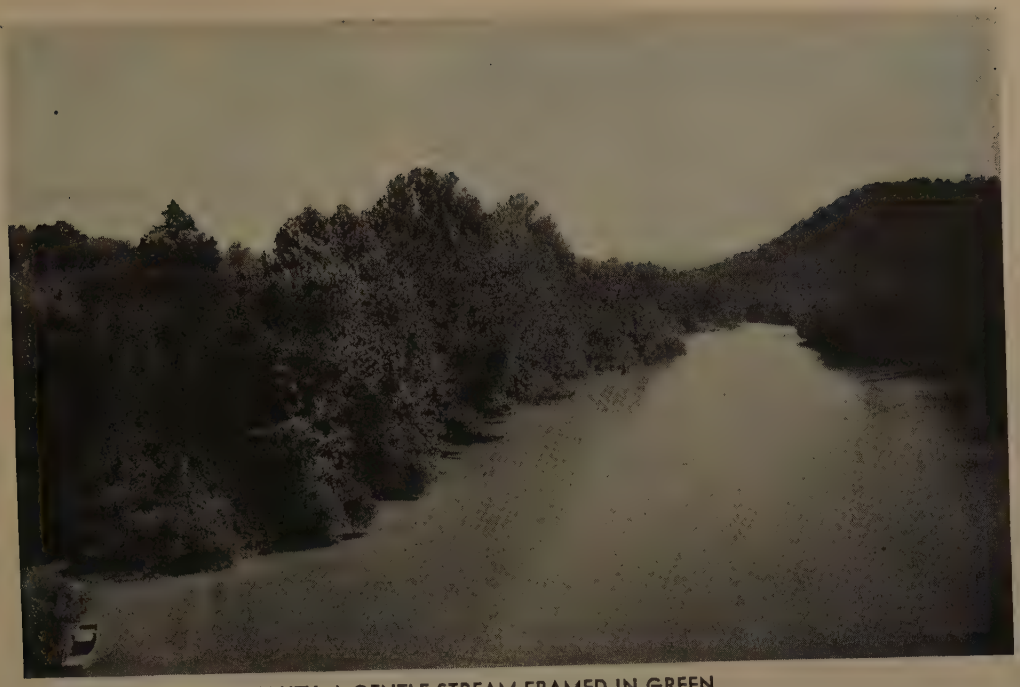
THE TEN-YEAR INDEX

Delayed owing to the tremendous amount of time-consuming detail connected with its compilation and editing, the Ten-Year Index to Nature Magazine is now immediately available. We appreciate the patience of those whose orders were placed several weeks in advance, but feel sure that the excellence of the index will repay the wait. Copies of this index may be obtained from the office of Nature Magazine at one dollar a copy.



A SCENE OF PLACID BEAUTY, A GENTLE STREAM FRAMED IN GREEN
Low willows and tall sycamores combine to adorn the banks of the Watauga River in the eastern part of Tennessee

WHERE HARDWOODS DWELL

BY MARY F. ROBINSON

PHOTOGRAPHS BY CHARLES W. ROBINSON

TREES have natural homes and other abodes to which they adapt themselves. Much lore regarding their habitats has been derived from ancient literature and from fossils. When primitive forests were extensive and undisturbed, some trees grew naturally along their borders, on high land or at the water's edge, others lived within the forests. A specific choice of haunt has always been and still is inherent in each tree species. Each seeks the place where it fares best.

Over the pond or at the river's bank the willow usually hangs its drooping foliage,

"And dips
Its pendant boughs, stooping as if to drink."

The ash fringes the wood or lives also by the river's edge, where, too,

"the plane tree's speckled arms o'ershoot
The swifter current that mines its root—"

In the autumn the trees that give most brilliance are those that love the water. Then the sour gum or tupelo adds its rich scarlet to the varying colors around our northern ponds, the sweet gum enlivens the southern woodlands, and "maple swamps glow like a sunset sea."

Within the forest was the oak's natural home. Its existence now is almost universal. In Europe it has been praised since the dawn of history for its rugged strength, and, probably because of its usefulness, it became sacred. Our shrine, the American elm, the embodiment in form of grace and beauty, originally was a forest dweller also, but it was and still is native only to our continent.

THE DECORATIVE CATALPA
A light-loving tree with open crown, it adorns our parks with beauty of blossom and leaf

Our eastern virgin forest once reached from the Atlantic seacoast to our great inland river. Here the early settlers cut the roads and made their clearings. In it was a gradual transition in the tree species from north to south. The northern hardwoods, yellow birch, sugar maple, paper birch, and beech,

AN ELM OF ANCIENT LINEAGE

Many such picturesque trees as this were spared when the New England settlers first cleared their land of virgin forest

graded into oaks, hickories, ash, and red maples, the common southern hardwood trees.

Throughout the region there were open spaces, bordering swamps and meadows by rivers, skirting the shores of islands, on natural eminences overlooking low country, along small clearings made by the Indians, or on the edge of burned sections. In these open spaces the trees made the most of their freedom. Here they developed the branches on the open side, adding much to the scenic beauty and enchantment of river, lake, and mountain.

Trees such as the aspen or poplar, ash, and birch, with open crowns and light foliage, light-loving trees, grew along the borders, as well as trees whose structure demanded more water for their roots. Chance exposures of such trees as beech and maple with very dense crowns, or oaks with less dense crowns, or any of those tolerant of shade, which naturally grew within the forest, gave freedom in which to develop latent beauties.

Bits of this great forest still exist. Several thousand acres with real virgin timber that contain some hardwood types are to be found in northern New Hampshire, and along the main range of the Green Mountains of Vermont. New Hampshire and Massachusetts have also a few other small areas. The uncut forest in the vicinity of Lynville, North Carolina, near the northern border of Pisgah National Forest, has the same kinds of hardwoods as New England because of the elevation. When the Great Smoky Mountains National Park of Tennessee and North Carolina is completed it will contain the largest stand of virgin hardwood in the United States.

Within the dense part of any natural forest, where there is a crowded growth of tall, straight-trunked trees with small leafy tops and no side branches, and a tangle of low vegetation with moss covered, fallen trees, the tree life is at any period a result of natural evolution or gradual change. Throughout the ages in which the forest exists, root systems are always struggling for soil, food and moisture. Some require greater depth of soil than others. Those roots that find their needs and develop determine which trees shall enter the struggle above ground. Long periods, when trees with open crowns which need much light are in the majority, are followed by other periods in which shade-enduring trees with dense crowns predominate. While some crowns reach for light, they protect temporarily beneath them seedlings and saplings which require shade.

The light-seekers use much of their energy from the beginning to increase the height of the trunk and crown at the expense of the growth of the root system which always remains shallow. The shade-enduring trees divide

A BEAUTIFUL SUGAR MAPLE

This tree of our northern woods develops, in the open, into a shade and ornamental tree of outstanding distinction and of superb beauty

THE OAK CHANGES IN THE OPEN

Growing without the competition of the forest, it reveals new beauties and rears an expanded crown

the periods of growth between the development of the aerial parts and the root system. After the growth of the sapling, the vitality is used to deepen or extend the root system. The third period of growth, stimulated by the increased root system, returns to the trunk and the crown. The trees that, when young, existed under the shade and protection of the light-seekers, finally exceed them in height and by shutting off their light cause them to die. Light-seekers return when disease, fire, or old age destroy the leafy tops of the dense crowns and allow light again to penetrate to the forest floor. Tree species vary with the temperature depending upon the altitude as well as the latitude of the forest section.

Cutting the virgin forest, transplanting, and importing trees has interfered with the original distribution, but the essential needs for each tree remain the same. Early settlers in Virginia found the tulip tree, a species then unknown to them, growing abundantly on lands near the rivers. They named it Virginia poplar. It is supposed that a colonist carried it back to England, because its occurrence as a cultivated tree in European countries is common. The followers of Boone into Kentucky noted that on the rich lands near the rivers there, the sweet gum was a magnificent tree of great dignity and height. Now they are found of great size only in the forests farther south. The settlers of New England frequently left in their cleared lands an American elm, a variety new to them, to develop as a field or hedgerow tree. A century ago the sassafras grew to tree size in New England woodlands. It exists there now in the wild only as a shrub, which is perhaps the result of lack of warmth due to the absence of forest protection. It is found as a tree in the wild state only from Pennsylvania south. Eastern United States is now the native home of most hickories. Out of the seventeen known species, fifteen are found wild in no part of the world except here.

Massachusetts is the borderland for both northern and southern hardwoods. All the common ones have adapted themselves to her glacial soil. Oaks are really more at home in the residual soils of long

A THRIFTY HICKORY

This tree is growing in the glacial soil in the Blue Hill district near Boston, Massachusetts

A BLACK WALNUT OF TENNESSEE
This tree grows best in rich, deep soil and reaches its greatest size on the western slopes of the boundary between North Carolina and Tennessee

making south of New England and New York, because their root systems are deep and massive. Tulip trees, hickories and walnuts also prefer the deep, rich loams farther south. Beech, a northern hardwood, has shallow roots. It grows in groves or without near companions of other species because its wide-spreading roots intercept all descending moisture.

A number of trees—poplars, birches, ashes, and maples—have such a wide distribution that they seem to be everywhere. Their light seeds carried by the winds travel more readily than do the fruits of the nut-bearing trees, which depend upon animals for their dispersal. The distance they travel and still live, however, is influenced by the vitality of the seed. Those of the willow lose their power to germinate within a few days. Red maple and silver maple keys, which disappear not long after they drop, germinate within a few weeks after they ripen, but other maple seeds do not sprout until the following spring.

After a seed has found its chosen soil, the chances for its development depend on many factors. Not only do heat, freedom of movement of water through the soil, amount of moisture, light, humidity of atmosphere, and mineral constituents of the soil affect its life, but growing space is of importance and also character of community growth, because trees, like people, have an instinct for congenial companionship. Not all the factors are needed in the same degree of intensity by tree families or tree species for each has its fancies. Intensity of light is vital for all birches.

The birch of Europe, according to Coleridge, is

"Most beautiful
Of forest trees—the Lady of the Woods",

Our gray birch is a small tree, ubiquitous in our northern woods, charmingly lining the wood roads through the coppices, and adorning waste and rocky lands with its delicate spray. It is indifferent to kind of soil or moisture and will endure more cold than many other trees. On sandy river banks in Maine and New Hampshire the canoe or white birches, whose beautiful barks peel so readily, form groups of unrivalled beauty. There is a picturesque grove of them on the slope of Mount Royal in Montreal. Yellow birches of size are not common in Massachusetts, because they enjoy cold, damp soils farther north. Those of northern Maine and New York state are famed for their great girth and tall, straight, clear trunks. We know one of good size in the Blue Hills section near Boston which grows in a space between two great boulders. Its roots are buried in a soil to which the sun's rays cannot penetrate. The black

A BEAUTIFUL ORNAMENTAL
This symmetrical pin oak, with its drooping branches, makes a beautiful tree to grace the grounds of any home or park

THE GINGKO, A UNIQUE ORNAMENTAL
This tree is the last survivor of its family and is not known to exist in the wild state

birch with its bark of wintergreen flavor has a distribution farther south than most of the other birches. Although it is happy in moist soils, it also climbs the sides of mountains and projects its roots in the crevices between rocks to get its necessary sustenance.

The oaks of the two groups, white and red, adapt themselves to most soils and conditions in eastern United States, but grow to greatest size in the Ohio Valley. The low scrub oaks thrive in the poorest soils. The live oaks require the heat of the southern states.

The rock or sugar maple shuns the company of the red maple. From the latitude of Massachusetts north, even across Canada to the western mountains, the maple with the sweet sap thrives. It seems to prefer the regions of longer hours of sunlight. From Massachusetts south is the home of the red maple, whose brilliance of color appeals to the eye. It prefers the greater warmth of the southern sun.

There are many charms in the miniature forest that grows by the edge of a field or nestles close to the stone wall that bounds the orchard. In such wooded borders in Massachusetts, which are nurseries for song birds and shelters for squirrels and chipmunks, we often find the sweet acorned oaks, hickories and butternuts, wild cherry trees, and buckthorns. Tree and squirrel help each other.

The ancestors of our forest trees—oak, maple, ash, walnut and hickory, willow, poplar and sycamore—have left traces in ancient rocks. Some date back millions of years before the Age of Mammals. Their fossils indicate a wider distribution of these species within the north temperate zone. The making of the Rocky Mountains exterminated the hickory, tulip, sassafras and gum from Western America. These same trees were lost to Europe by the moving of the Great Glacier. They could not naturally return with the swinging back of the warmer climate, because of mountains and broad oceans, which were barriers to migration.

The transition from wild trees to cultivated ones is nearly as old as man. They have been cultivated in the open for the food they produce and for beauty, but trees to be useful as timber must be left to grow within the forest. Trees for ornament of parks, pleasure grounds, estates, and waysides have their esthetic value, and are chosen for various reasons—beauty of blossom or leaf, symmetry or immensity of form, delicacy of spray, openness of crown for gardens, or denseness for shade. There is fascination in the beauty of a well-trained tree and in the pose and orderliness of those planted for decoration. There is sacredness attached to the living tree planted as a memorial. There is honor bestowed on many a tree because of its sponsor. And often there is joy that comes with association with some particular tree—"It is rooted in our richest feelings, and our sweetest memories, like birds, build nests in its branches."

But there is no charm like that of the wild tree, and in many instances no greater usefulness. We, like Ruskin, love to see trees as pilgrims—"hiding from winds, reaching to sunshine, crowding to drink at the stream-side, climbing to heavenward ridges, opening in dance round mossy knolls, or gathering to rest in the fields."

A TREE OF GRACEFUL BEAUTY
Everywhere through our northern coppices the gray birch charmingly lines the wood roads

HOW CAN FATHER FISH EAT? BY SAMUEL F. HILDEBRAND

THE FINNY tribe is a mysterious one in many respects, and its ways of propagating its kind are numerous and diverse. Some species cast their eggs promiscuously in the open waters where they sink or float according to the weight of the eggs. Thereafter they simply are left to the mercy of the elements. If conditions are favorable they hatch in due course of time. Other species lay their eggs in more or less carefully prepared "nests" in which they generally are guarded by the male parent who fans them to keep them clean and healthy. Still others attach their eggs to plants, shells and other objects in the water. Some species have a pouch in which they incubate the eggs. However, the strangest method of all of hatching the eggs is that found among the "mouth breeders"; so-called because they hatch the eggs in the mouth. This arduous duty is performed by the male.

COURTESY U. S. BUREAU OF FISHERIES

FATHER CARES FOR THE EGGS

Here is a male gaff-topsail catfish incubating eggs in his mouth

The salt water catfishes of our own shores are among the most notable and the largest mouth breeders. The common gaff-topsail catfish, which reaches a length of about twenty-two inches, has eggs an inch in diameter, yet as many as fifty-five have been counted in the mouth of one male parent. Such a large egg, of course, has a long incubation period. Just how long is not known. Certainly the eggs must be carried at least a month. When the young hatch, although an inch and three-quarters long, they have such a large yolk sac attached to them that they are unable to swim and still must be cared for for a week or two longer in the paternal mouth. When the young finally are released they are about four inches long.

How does father fish eat when his mouth is filled to its utmost capacity with eggs and young? The fact seems to be that he simply does not feed. Such a long fast would be a great hardship, and in some cases it would be fatal, among the higher vertebrates. However, fish as well as several other cold blooded backboned animals sometimes fast for long periods of time, apparently without great discomfort, and certainly without permanent injury. Although the male catfish has a difficult task to perform in perpetuating his kind, he does not sacrifice his life in the process as do the Pacific Coast salmon. Certainly no catfish is known to have died from exhaustion in completing the reproductive process.

• • •

HOUSE REMODELLING

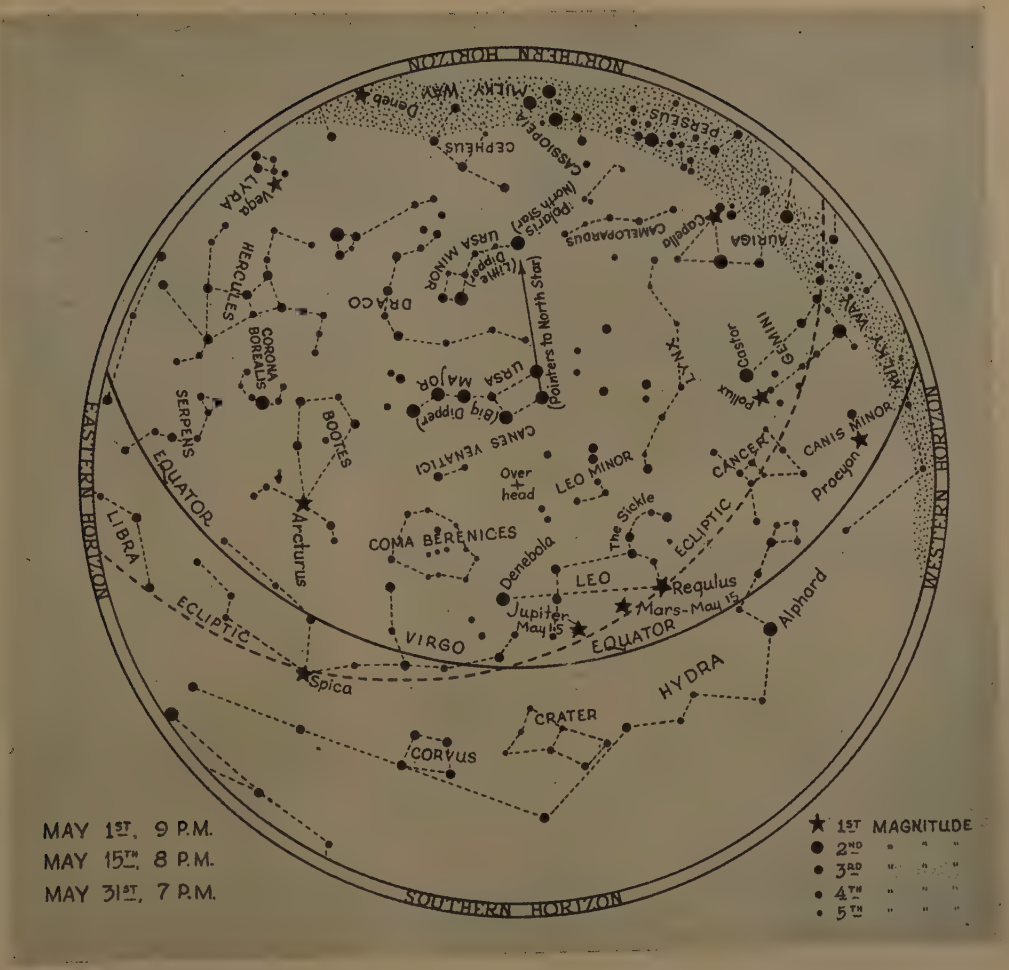
BY LEWIS WAYNE WALKER

WHEN "we humans" desire to put on an extra room, it means weeks of plaster dust, noisy hammers, and general disturbance. Normal work ceases, disorder reigns. In the insect world, however, there is one family in particular that can enlarge its dwelling without a cessation of ordinary work. In Maine, several years ago, I located a tiny bag-nest of paper wasps. It did not interest me at the time, but when, a week later, I saw that it was fully a half-inch wider and longer, I became intrigued.

THE PAPER WASPS EXPAND

Needing roomier quarters they build additions to their pendant home

Investigation disclosed three thin walls, with quarter-inch air spaces separating them. The inside one was torn and ragged, and being pulled to pieces. The second one was in perfect order, while the third, or outside one, was in process of construction. Each bit of "paper" from the inside was re-chewed and added to the outside to achieve roomier quarters. Later in the summer this nest measured ten inches across, which meant that the wasps had built and torn down—to build again—between fifteen and twenty individual walls. All during this remodelling the queen continued to lay eggs, the young were successfully raised, and the chain of life went on.



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south

OUR NATIONAL OBSERVATORY

BY ISABEL M. LEWIS

THE United States Naval Observatory at Washington is to the United States what the Royal Observatory at Greenwich is to England, or the Paris Observatory is to France. It is our National Observatory.

Founded more than ninety years ago to serve the needs of the Navy, its early history is closely associated with the names of four Lieutenants of the Navy—Goldsborough, Wilkes, Gilliss and Maury. Through the untiring efforts of these men it came into being as a Depot of Charts and Instruments. It has developed gradually into one of the great modern observatories and its record, like that of the Navy itself, is one of honor and service. It has to its credit, among other things, the discovery of the satellites of Mars by Asaph Hall in 1877, with what was then the greatest refractor in the world; and the valuable contributions to astronomy made by its two greatest men, Simon Newcomb and George W. Hill, who were also two of the greatest mathematicians and astronomers this country has ever produced.

The Naval Observatory, like most national observatories, is concerned chiefly with the problems of fundamental astronomy or astronomy of position. It seeks to obtain a long, continuous series of observations of the sun, moon, stars and planets and to reduce and publish these observations as far as possible. It is essential for the progress of astronomy, as well as for the needs of navigators, that the positions of these bodies be accurately determined and that the tables and catalogs derived from such observations be improved and brought up to date.

Observations of the sun, moon and planets were begun at the newly-founded observatory in 1845, and they have continued from that time to the present. In the fall of 1846 the first volume of observations was published and was characterized as the first volume of astronomical observations ever issued from an institution properly entitled to the name of an observatory on this side of the Atlantic.

The determination and distribution of time is properly

the function of a national observatory and the Naval Observatory time signals are second to none in the world in accuracy. Naval Observatory Time is a phrase with which everyone in the United States is familiar, so universal is its distribution and use. Time is of the greatest importance at sea in the determination of longitude, and Naval Observatory time signals are broadcast primarily to meet the needs of the Navy, the Coast Guard and the Merchant Marine, although they are also essential to the Coast and Geodetic, Geological and other Surveys, and the astronomer everywhere, not to mention the general public.

Although everyone knows that time comes directly or indirectly from the Naval Observatory, it is not so generally known that the errors of the nation's clocks are determined from observations of the transit of stars across the meridian. Observations of star transits are made at the observatory on every clear night for the purpose of determining the correct time. New precision sidereal clocks have been installed at the Naval Observatory, and a new clock vault has been completed and placed in commission. Its performance has proved even more satisfactory than was anticipated. There are also other new features connected with the time service, devised and perfected by astronomers at the observatory, that have increased the efficiency and value of this service.

The *American Ephemeris and Nautical Almanac,* published in the Nautical Almanac Office, consists mostly of figures and is poor general reading, but it is to be found in every observatory in this country and in many foreign observatories, as well. It also makes available data for various almanacs published by private firms or newspapers. Since it is published several years in advance it is readily obtainable for such purposes. It gives astronomical data and information that is absolutely indispensable to astronomers and navigators.

So important is this information that every leading country of Europe publishes its own national almanac. Since the computations entailed in the preparation of such a volume are extremely heavy and time-consuming, there has been established by international agreement an exchange of work between the various almanac offices to avoid unnecessary duplication of work. This exchange with foreign almanac offices was approved by Congress in the naval appropriation bill of 1912 with the provision that such arrangement shall be terminable only on one year's notice, and that the work of the Nautical Almanac Office shall be so conducted that *in case of emergency* the entire work intended for the use of navigators may be computed by that office without any foreign cooperation whatsoever. In number of employees this office is one of the smallest in the government service, but its work is the most highly specialized. Its staff must possess a knowledge of higher mathematics, astronomy and practical computation requiring special training in this unusual work after appointment. This progressive training makes them increasingly valuable with length of service.

Like the Royal Observatory at Greenwich, the Naval Observatory is at this time undergoing a modernization process and new telescopes and buildings are now in process of erection. In addition to the civilian staff engaged in astronomical work, there is also a small naval personnel engaged in maintenance, repair and distribution of navigation instruments for the Navy, such as sextants, binoculars, telescopes, and gyro and magnetic compasses. There is also an aeronautical division engaged in experiments and research work in design, development and improvement of aeronautical instruments.

The library of the Naval Observatory is considered the most complete astronomical library in the world and it contains many rare and valuable astronomical and mathematical works. It is open to visitors in office hours as well as to students of Washington universities, and others engaged in research work in astronomy or mathematics who wish to make use of its valuable facilities for study and research. It is of course indispensable to members of the staff who draw upon it heavily and continuously in connection with their work as well as for home reading and study.

All of the work of the Naval Observatory is under the administration of the superintendent, a naval officer required by law to be not lower than the rank of captain of the Navy. There is also an Assistant Superintendent with the rank of captain of the Navy who is the head of the Supply Division. An Astronomical Council, the membership of which consists of the Superintendent and Assistant Superintendent, the Director and Assistant Director of the Nautical Almanac and the heads of Divisions in the Department of Astronomical Observations, meets at frequent intervals to discuss and decide upon matters connected with the astronomical work of the Observatory.

The publications of the Naval Observatory at present consist of the Annual Report of the Superintendent; the annual *American Ephemeris and Nautical Almanac* and the smaller *American Nautical Almanac* and a recently issued *Air Almanac;* two series of publications entitled *Astronomical Papers of the American Ephemeris* and *Publications of the U. S. Naval Observatory, Second Series* (formerly *Washington Observations*). These two series appear at irregular intervals.

All appointments to the scientific staff of the U. S. Naval Observatory come under the classified Civil Service, and the eligible list contains the names of those who have passed a competitive Civil Service examination. Many members of the staff belong to the American Astronomical Society and other scientific societies and the Observatory is, of course, represented in the International Astronomical Union. Although its work as a National Observatory is necessarily different in many respects from that of other American Observatories, the United States Naval Observatory stands second to none in the United States in the value and importance of its work to the general public and astronomers and navigators everywhere through its Time Service and its accurate predictions of the positions of the heavenly bodies and astronomical phenomena and events day by day and year by year.

The evening skies in May (Continued on page 262)

NATURE RAMBLES WITH UNCLE DICK

A DEPARTMENT FOR THE YOUNG FOLKS

• • •

THADDEUS TOAD LOVED TO STAY IN BED IN THE MORNING, IT WAS SO COMFORTABLE, AND THIS MADE HIM LATE FOR THE BREAKFAST YOU SEE HIM AWAITING BELOW

A DAY IN TOADVILLE

AS PHOTOGRAPHED BY ERNEST LAW

THADDEUS TOAD loved to stay in bed mornings. It was such a comfortable place that his wife, Trixie Toad, had to call and call to make him get up. He often said, as an excuse, that they make beds much too soft.

By the time Thaddeus finally got down to breakfast it was late. All the little Toads had gone off to school in the garden. So their father had to gulp down his breakfast in a hurry, which is very bad, even for toads. As soon as his cereal and soft egg were eaten, Thaddeus would say goodby to Trixie and rush out to the garage for his car.

Now Thaddeus was a good driver, but it is dangerous to be in too much of a hurry while driving. This he found out one morning when he was very late and driving much too fast. Young Egbert Turtle was also driving too fast in a new racing car his father had given him. They found that two automobiles cannot be on the same spot at once, but happily the accident was not serious.

BEING LATE, THADDEUS DROVE TOO FAST AND YOUNG EGBERT TURTLE WAS ALSO SPEEDING ALONG IN HIS RACER, WITH THE RESULT THAT YOU SEE HERE

Egbert was tossed out but landed on his hard back. Thaddeus was late at the office, both because he had to help untangle the two cars and because he drove much more slowly the rest of the way.

This experience really upset Thaddeus very much. He thought about it all morning at the office. He promised himself to get up earlier and drive slowly to the city and enjoy the scenery and the

THE ACCIDENT BOTHERED THADDEUS SO MUCH THAT HE CAME HOME EARLY FOR TEA AND PROMISED TRIXIE THAT HE WOULD GET UP EARLIER IN THE MORNINGS

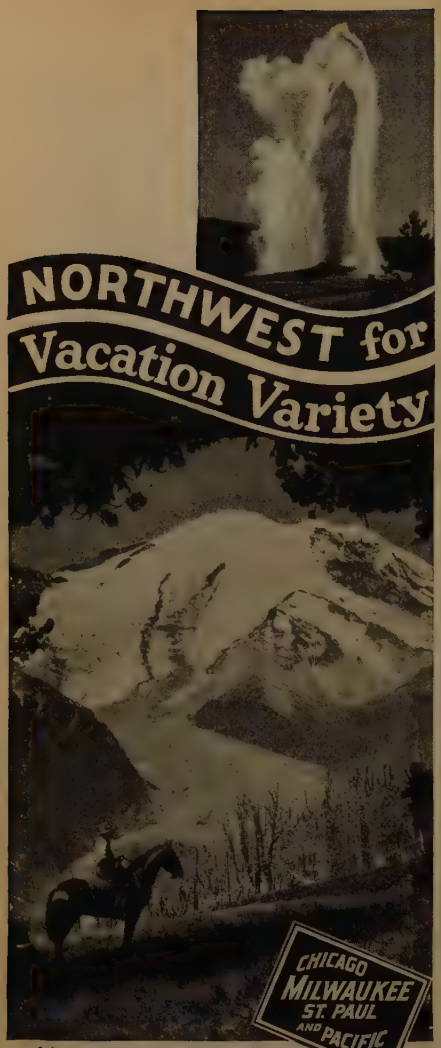
cool morning air. He went home early and had tea with Trixie and told her about his new resolution. She told him she thought it was a fine idea, but she said to herself that she would probably have to call him the next morning.

After tea, Thaddeus suggested they take a ride into the country. Before they had gone very far the car stopped. Thaddeus got out to look at it although he didn't know much about machinery. He decided that it was because

THADDEUS ASKED TRIXIE TO GO FOR A RIDE IN THE COUNTRY, BUT THE CAR STOPPED AND THEY LEFT IT TO TRY A SEE-SAW THEY HAD SPIED IN A NEARBY YARD . . . AND WHEN THE CAR STILL REFUSED TO RUN, THADDEUS DECLARED THAT HE WOULD GET A HOUSE-WAGON DRAWN BY A HORSE, WHICH, OF COURSE, HE REALLY DIDN'T DO

of the accident that morning, so he told Trixie to get out and, spying a see-saw in a nearby yard, they decided to amuse themselves with it. This was a good idea until little Tommy Turtle, whose see-saw it was, crawled under one end and spoiled the fun. So Thaddeus tried to start the car again but finally gave it up and had it towed back to his house, resolving that he would get a horse-drawn house-wagon for his playtime.

The ten winning answers in the Canary Contest will be found on Page 255 of this issue.



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NATURE IN PRINT

Dr. Howard Reminisces

Those who have been privileged to know Leland O. Howard know him for a man of charm, wit, breadth of experience and interest, as well as for his position in the front rank of the world's entomologists. It has been the privilege of NATURE MAGAZINE to have him as a member of its Scientific Consulting Board, both while he was Chief of the United States Bureau of Entomology and since his retirement. Those who have not had the opportunity to know this genial gentleman are now able to do so by proxy through the pages of *Fighting the Insects*. This is an autobiography of a man who has lived a full life; who has done more than any other to bring to public attention the significance of the insect world in its relation to the whole scheme of things.

In a few prefatory words Dr. Howard says that many have considered those who have studied and collected insects as sort of freaks. Some of these, he confesses, may be odd, but there are as many freaks running banks, selling insurance and raising cattle. Recent years, however, have seen a growing recognition of the economic importance of insect researches. To this Dr. Howard has largely contributed. In this story he tells of that contribution in his own words, modestly, humorously and entertainingly. He regards himself as perhaps "more like the average man than is the average entomologist." He has enjoyed his life and has a fine zest for telling of it. Such a combination makes for a work of outstanding readability as well as provides a distinct contribution to the story of entomological development. The publishers of this book are the Macmillan Company and they offer the volume at a modest $2.50. It is notably well worth the investment.

R. W. W.

A Human Bird Book

For some reason *The Wayside Inn for Birds* has just come to our attention although it issued from the presses of D. C. Heath and Company in 1929. Here is a most human little book published as a supplementary school reader but really worthy of more catholic dress and distribution. It is the joint work of John Lawrence Martin and James Hay, Jr. The former was an invalid boy with a great love for and interest in bird life. From his porch he rigged an ingenious feeding station, and studied and made copious notes about the habits and personalities of his avian guests. To these experiences Mr. Hay, well-known newspaperman of the Nation's Capital, has added a charm of writing making the whole a most appealing volume. It strikes us as an item for the school supplementary reading list of a sort all too infrequently discovered on that list. Most of the outside reading we had to do in elementary school was somewhat of a chore. Getting acquainted with the birds that visited this wayside inn would not have been. This book is still available at a postpaid price of one dollar. Should any of the readers of NATURE MAGAZINE desire, they may purchase it through our own book department.

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The Canary Contest

We had planned earlier to print the ten successful replies in the contest based upon the canary and wild bird picture on our January cover, but had to content ourselves with announcing the winners in March. It will be remembered that the question was: "What is the canary thinking?" Here are the answers which the judges regarded as best. They are not arranged in the order of excellence since no attempt was made to so rate them.

"I wonder! If I were out there would I be cold and afraid of that big, red bird? I guess I'm lucky."—COOPER EVANS, Grundy Center, Iowa.

"I *envy* you beautiful brothers and sisters enjoying yourselves so much. I feel like a poor little rich bird. Selfish?"—MURIEL ZOLL, Elmhurst, L. I., New York.

"The canary is wondering why the wild birds are hunting in that queer place and whatever they can find there."—BOB DREW, Santa Monica, California.

"Tweet. Glad I'm a canary. Would hate to have to dig my breakfast from under the snow. Sorry for them."—VIVIENNE JOHNSTON, Waynesboro, Georgia.

"Where do they come from
So bright and gay?
I wish I could join them.
I'll ask if I may."

ISABEL LUCIANO, Amsterdam, New York.

"With that cardinal on guard, just how much would I get if I were outside?"—ROY MARTIN, Cedar Bluffs, Nebraska.

"I want to go out with the cardinal, juncoes and nuthatch. I can see them. What is keeping me in?"—JOHN TAYLAR, Milwaukee, Wisconsin.

"How pretty you are, cardinal. But everybody says that my song is more beautiful than yours."—JOSEPH DOWNEY, New Bedford, Massachusetts.

"First time I ever saw a nuthatch with other birds. They always spread their wings and bluff."—ROBERT GRIFFITH, Boone, Iowa.

"The canary is thinking
How thankful he should be,
To have a home
While those birds
Depend on other's charity."

ROSALIE HOFFMAN, Newark, New Jersey.

Malayan Wild Life

One of the most thoroughgoing studies of conditions of wild life is to be found in the first two volumes of the report of the Wild Life Commission of Malay. The investigation was conducted under the direction of Theodore Hubback, who functioned as chief in an honorary capacity in order that he might thus be able to serve in an entirely impartial manner. It would be impossible to indicate even sketchily the amazing amount of ground covered, but the report is a monument to thoroughness and sincerity. To us Malay is merely a place on the map, but were we ever going there we would tuck these two volumes in our trunk and by the time we arrived we would certainly know a lot about our destination.

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CAPRI SANCTUARIO

(Continued from page 234)

our way up the winding road cut in the cliff side. At a three-foot cross street (there is only one main road for vehicles on the whole isle) we alighted, and a few moments' walk along an intersecting wider walk brought us to Villa San Michele. This lovely estate and its ancient chapel would take a book to describe. And then one must really see to believe.

To our consternation the pretty guide who let us in emphatically denied photography, explaining that *il Signore* never permitted such. Encouraged by our first success we presumed, again by mail, upon the good doctor's generosity. Two days later a hasty pencil note—written, I suspect, on a doctor's prescription sheet—opened the gate once more to movie and to snapshot. The views—the Chapel, the Roman collonated patios, the police dog and pup, the pretty guide, and even Louisa, the pet lamb, and Amanda, the turtle—fell victims to our photographic hobby. The bird sanctuary, "Sanctuario San Michele"—was snapped on Kodak film and Ciné reel.

And as we tramped through it, down the slopes of Barbarossa's stronghold, with western sun sinking into the sea beyond Peurta di Campetiello, we seemed to hear the song and feel the whirring wings of thousands upon thousands of unborn songsters, giving throaty sound of praise to their benefactor who, beginning January 1, 1933, had given them not only San Michele Sanctuario, but forever safety and freedom throughout entire Capri, the charming isle.

Hornaday—Conservationist

Dr. W. T. Hornaday, who has devoted a large part of a long life to work in behalf of the wild life of the world, has recently been awarded another medal for distinguished achievements in the cause of conservation. The medal, which represents the tenth annual award made by *Outdoor Life* magazine, is of gold and is embossed with the head of a grizzly bear. The ceremony was marked by a luncheon given in honor of the recipient, and was attended by Dr. Blair of the New York Zoological Society, H. E. Anthony and James E. Clark of the American Museum of Natural History, and a number of other conservationists of national reputation. The presentation was made by Harry McGuire, Editor of *Outdoor Life*.

Dr. William A. Bruette, long editor of *Forest and Stream*, complimented the donors on their good judgment in picking Dr. Hornaday for this honor, and stated that while there still remain many battles to be won, every battle in which the doctor had been engaged, and which had been concluded, had been won by him. And let us add—that a number of worthwhile battles for the continued existence of our persecuted wild life that are now in progress, and in which Dr. Hornaday is helping, must be won, and quickly, if many of our most interesting species of birds, now disappearing because they are classed as game, are not to be virtually exterminated.

More About Koalas

In the story about the interesting little Koala bears of Australia published in NATURE MAGAZINE for July, 1932, the author, Miss Winifred Duncan, stated that

You haven't seen anything yet

● I'll show you fifty glaciers and a hundred peaks that try to reach the sun. I'll show you fossil beds from the bottom of an ancient ocean up on a mountain top. I'll show you Alpine lakes that outmode Switzerland. And I'll show you broiled trout that would tempt Mahatma Gandhi. Right here in

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ATLANTIC CITY

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nly three Koalas have ever left Aus-lia—a hardy old male that went to the ndon Zoo and lived just six weeks, and o bears which were taken to California d died almost at once." This statement re-ntly came to the attention of Dr. Eaton . MacKay of The Scripps Metabolic Clinic La Jolla, San Diego, California. He writes say that the San Diego Zoological Society s exhibited two specimens of Koala, one old male who lived there for two years d eleven months, dying in 1927, appar-tly from old age. The other was a young ecimen that had been kept for a year by Mr. Johnson of San Francisco and subsist-d on a diet of bread, milk and eucalyptus l. This fare was not salutary and the bear as in poor condition when sent to San iego, although it improved on blue gum liage there and lived for eight months. r. MacKay says that two of the species of ucalyptus upon which the Koala exists in s native environment grow in the San iego Zoo, and he expresses the opinion at the Koala would do well in the en-ironment of San Diego, failure in the past eing largely due to the condition of the ecimens available.

Yosemite Nature School

On the twenty-sixth of June the ninth ession of the Yosemite School of Field Natural History will open in Yosemite National Park. Set up to train for naturalist work in the National Parks, this course is invaluable to those preparing for Nature guiding, Nature counciling and field work in natural science teaching. The well-equipped museum on the floor of Yosemite Valley is the headquarters of the school and the whole park serves as a field labora-tory. The climax of the course, which ends on August 11, is a week's trip cover-ing the High Sierra camps with side trips for study above timberline. The enrollment in the course is limited to twenty, and three years' college work, or its equiva-lent, and some background in the sciences are essential qualifications. A distinguished group of instructors will assist the regular naturalist staff of Yosemite National Park. Application blanks and other information may be obtained from C. A. Harwell, Park Naturalist, Yosemite National Park, Cali-fornia.

Virginia Bird Meeting

Legislation giving complete protection to ruffed grouse in counties in the Pied-mont section of Virginia and in eastern parts of the State was asked in a resolution adopted at the recent meeting of the Vir-ginia Society of Ornithology in Norfolk. It was pointed out that the grouse are much diminished in those sections. The fol-lowing officers were elected: Prof. Ruskin S. Freer, Lynchburg, president; Charles O. Handley, Ashland, vice-president; Dr. Florence Hague, Sweet Briar, secretary; John B. Lewis, Amelia, treasurer. It was voted to hold the 1934 meeting of the society in Alexandria.

Bird Bill Killed

For some unexplained reason the bill filed with the Legislature of Connecticut to recognize the rose-breasted grosbeak as the State Bird was reported unfavorably by the Judiciary Committee of that Legislature.

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Nature Magazine readers should also refer to page 185 of the April issue for a larger illustration of the model "Britannic." Available in 3 sizes—18", 20", 30" at $10.00, $15.00 and $20.00 respectively.

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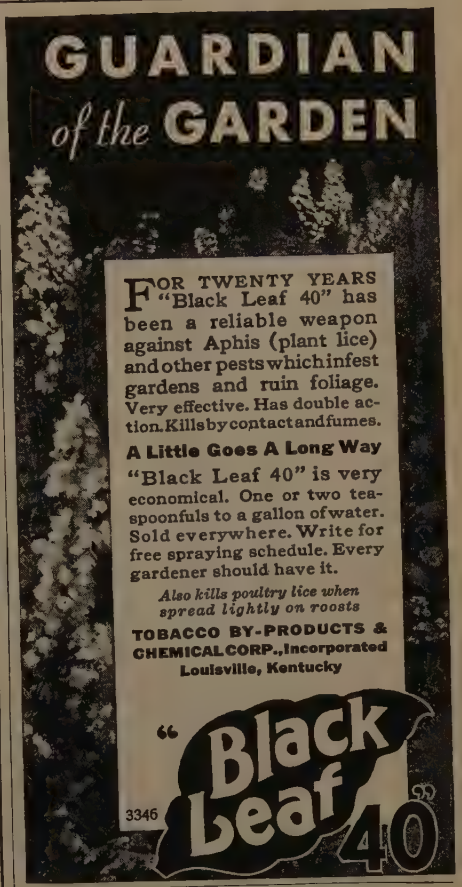
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A curly head to a mother's breast.
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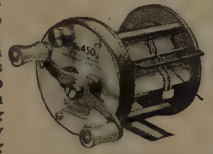

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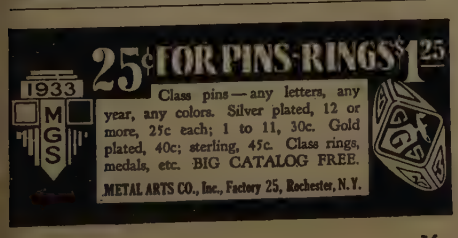
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GARDENS AND GARDENING

Edited by
ROMAINE B. WARE

May is the month of tulips in most gardens. They make gorgeous pictures when planted in drifts, either by themselves or in the hardy border. If your garden lacks these spring flowering bulbs make it a point to learn the varieties that appeal to you by seeing them while in bloom. Spring-blooming bulbs must be planted in the fall, but unless firm resolutions are made to have them they are often overlooked at that time.

This is probably the busiest month in the garden year. Wherever one turns there are tasks to be done. Planting, transplanting, cleaning up, preparing for later planting, pruning, spraying, fertilizing, watering—it seems an almost endless array. Among the early blooming flowers, pansies and primroses are two that may be planted as late as this and yet give immediate effects. The better strains of modern pansies are among the season's most colorful flowers. Although good strains of pansy seed are expensive, the best plants are reasonable and few spring flowers are more delightful. Plant them in quantities for mass effect.

Plant Primroses Now

Few gardeners realize they may set out primroses up to and, even, during their blooming season. One of the largest growers in the country says he successfully ships them every month from March to November. Primroses, once you fall under the spell of their charm, can easily become an intriguing hobby. There are said to be several hundred varieties. One catalog lists plants of more than sixty kinds, and a single seedsman offers more than one hundred fifty varieties of seeds. They come from all over the world. Many are easy to grow and others are contrary enough to try the patience of a saint.

It is not too late to plant chrysanthemums. Small plants set out now and pinched back a couple of times during the summer will provide billows of bloom from early fall until final freeze up. Especially interesting are the new varieties that start flowering in the later part of the summer and get better as the weather becomes cool. If your border space is crowded plant a dozen in the vegetable garden. They may be used for cutting, or may be moved, soil and all, to the border just before blooming. Do not buy large clumps; young plants with one or two stems will give much better results.

With dahlias selling at the prices they are today one can get a whole garden full for a few dollars. Even the new novelties are not too costly. The miniatures, dwarf hybrids and pompons, are excellent in the border and may be had most reasonably. Raising dahlias from seed is extremely fascinating because one may produce anything from the commonest scrubs to the finest exhibition blooms. Seeds of various strains may be bought at prices ranging up from less than a dollar. One Pacific Coast grower offers a hundred seeds at a hundred dol-

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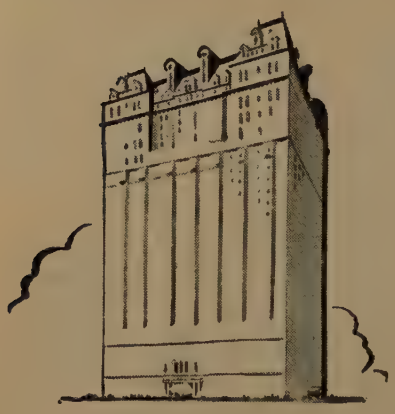

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lars! Of course, if you could be sure of raising a prize winner like the 1932 champion, Amelia Earhart, a dollar a seed would be cheap, but it is all a big gamble as well as an interesting one.

Roots Versus Plants

The controversy as to whether to purchase plants or roots of dahlias is not as heated as it was once. Properly-grown plants are considered to give not only good flowers, but, also, to make good roots to carry over. Most growers offer green plants at half the price of roots, and for average garden planting they are a good buy.

About this time of the year moles become a serious pest in many sections. Numerous methods have been tried to control them. The U. S. Biological Survey, in one of its bulletins, states that, "it is impractical to poison these little animals or combat them successfully in any way except by the use of traps." Out in the Pacific Northwest, where they are numerous, a new and simplified mole trap has been perfected. It is called the Acme and those who have used it say "it is the most efficient mole trap on the market." In spite of the good these little animals are credited with doing in the soil, there are sections like lawns and gardens from which they must be barred.

Home Propagating

A wide variety of perennials may be planted at this season. With prices at the present low levels wonderful borders may be made quite reasonably. One can also make what might be termed a foundation planting, or a planting for propagation purposes. Many valuable perennials are easily propagated, and by buying a plant or two of a kind, quite extensive plantings may be developed in a year or two. Phlox, fall asters, violas, helenium and a score or more other perennials may be grown this way. They may also be raised from seed sown early in the summer. Not all kinds lend themselves to this practice because seedlings in many cases produce inferior plants. But there is always the gambling chance of producing unusually good things from seed.

Don't be in too great a hurry about setting out annuals and other summer-blooming flowers. Cold wet ground and late frosts may wreck carefully laid plans. Warm light soils may be safely planted much earlier than heavy cold ones. Gladiolus, for early bloom, may be planted sooner than dahlias. The latter are primarily fall bloomers and if set out too soon the plants reach maturity and become

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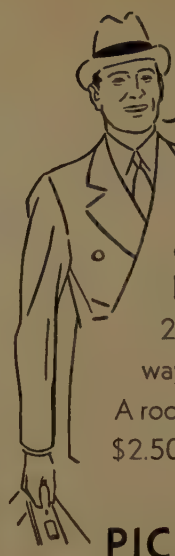

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oody before cool weather arrives and the est blooms usually develop. In buying lads, you can save materially by getting mall-sized bulbs that are usually termed umber threes and fours. They all bloom ell with flowers almost as large as the arger bulbs and the increase in bulbs and ulblets is even greater than with first-ized bulbs.

New Hardy Aster

Gardeners who want the best will try the ew hardy aster, frikarti, also known as he Wonder of Staefa. Its lavender-blue lowers are immense for an aster, being early three inches in diameter, and the plants are seldom without bloom from June till November. Buy one or two plants and next year you can divide them and make a dozen or more. *A. frikarti* reaches a height of about three feet, so should be planted in the middle or rear of the border. This extra fine aster is scarce, as yet, but a few dealers list it.

If you are planting azaleas in your garden this spring, and there is still time to do this, they demand an acid soil. This may be achieved by digging the hole twice as large and as deep as the root spread of the plants require and filling in with a soil that is one-third to one-half pulverized peat moss. Peat not only adds drainage while still retaining a good degree of moisture, but also creates an acid soil condition. Azaleas, both the hybrids and the species, are among the most showy of the spring shrubs and may now be bought quite reasonably.

As you thumb the seed and nursery catalogs, scan the collections. Short-sighted dealers still put junk in their collections, but others offer good varieties at special prices, giving one the benefit of quantity production. Bulbs, seeds and plants of all descriptions are sold this way and savings are material. Frequently collections are offered by dealers simply for advertising purposes and are extra good.

Hot Beds

Again and again we read that this or that should be started in a hot bed. In this machine age the necessary fresh manure, so

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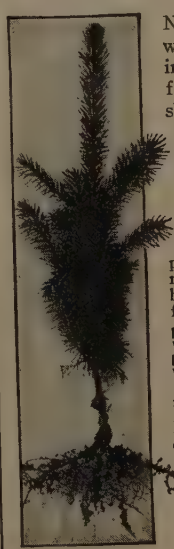

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plentiful in years past, is almost unattainable. Science, however, has come to the rescue and electricity now does the job much better and, considering the results, at no greater cost. From the amateur gardener's standpoint, the electric hot bed heater is vastly superior. A grower reports that hardy phlox, formerly rooting about 45 per cent in three months, roots in an electric hot bed, 95 per cent in fifteen days. Due to uniform temperature maintained by thermostatic control, seeds and cuttings develop in one-half or one-sixth of the time and produce almost 100 per cent. The units are not costly and thousands of home gardeners will soon be using them.

As soon as the weather is settled and the ground begins to warm up, seed of annuals may be sown outside. Dwarf sweet alyssum is an ideal edging for beds and borders blooming the entire season. Plant it quite thin so the individual plants will not be closer than three inches. An occasional seed of the lavender variety, say every foot to eighteen inches, produces an interesting edging. Poppies, of course, must be seeded where they are to bloom. Don't plant too thickly because it spoils the effect. There are many varieties of poppies and one should try out some with which they are not familiar. This applies to all phases of gardening. Try something new each year; don't be satisfied with the same old things. Give yourself a treat of new colors, forms and types of flowers. You'll get a real thrill as strange plants bloom for the first time. They are not costly thrills and are surely worth while.

• • •

OUR NATIONAL OBSERVATORY

(Continued from page 250)

have an entirely different aspect from those of a few months ago. Gone are the brilliant winter constellations, Orion and Taurus with its Hyades and Pleiades, and Canis Major with its brilliant Sirius. Procyon, popularly known as the little Dog-Star, may still be seen low in the west, also Castor and Pollux in Gemini and Capella in Auriga. The Big Dipper is seen at its best in the evening hours at this time of year. It is on the meridian high above the pole at nine P.M. the first of May. Spica in Virgo, shines like a brilliant diamond in the southeast and Hydra, The Water-Snake, now lies completely above the horizon and extends from a point southwest of Leo and below Cancer, where a group of faint stars mark the head, in a long line of faint stars almost to the southeastern horizon. It has but one bright star, Alphard, lying a few degrees southwest of Regulus in Leo, which is now conspicuously in view in the western sky close to the meridian. Corvus, The Crow, forms a compact little quadrilateral of stars also close to the meridian, with Crater next to it on the west, both Riders of Hydra. Corvus is about equal in size to the Southern Cross which is not visible in our latitudes. It lies due south of Corvus below our southern horizon and may be seen in southern Florida and Cuba. Arcturus is now conspicuously visible in Bootes high in the eastern sky and next to it on the northeast is that beautiful little circlet

of stars known as Corona Borealis, The Northern Crown. The Milky Way, so brilliant in winter months, now lies so close to the northwestern horizon that it cannot be seen in the evening hours. Vega, brightest star of the northern hemisphere of the heavens, though differing little in brightness from Arcturus, is now visible far over in the northeast.

Among the planets this month Jupiter and Mars are still conspicuous in the evening sky. Mars, which has decreased noticeably in brightness since its date of opposition in March, is near the meridian at sunset the middle of May. It is still in Leo. Jupiter also is in Leo a few degrees southeast of Mars. These two brilliant planets in the same constellation and only a few degrees apart for many weeks have attracted much attention. Venus is now in the western evening sky; although still close to the sun it will be picked up in the evening twilight some time this month. Saturn is in Capricornus and rises shortly after midnight early in May. Mercury is in the morning sky the first of the month but too close to the sun to be seen except possibly the first few days. It will be in the evening sky after superior conjunction with the sun on May 28, but too close to it to be seen.

Wise Use of Land

Confronted with an increasing reversion to the state of lands lost by the owners by virtue of tax delinquency, the Mississippi Association for the Conservation of Wild Life has adopted a progressive and stimulating program directed toward the wisest use of this land in the interest of wild life protection and forest production. Under the program county units would consider the best probable use of this land and report to the state organization, following which the situation would be canvassed to have this land set aside for a conservation purpose. The program has its wide variations and ramifications, considering the use of this land in behalf of a variety of educational and productive endeavors. Space does not permit its detailed consideration here. However, those interested in this question—which is by no means peculiar to Mississippi—may obtain details from Fred B. Merrill, State Forester, 303 Old Merchants Bank Building, Jackson, Mississippi.

Moth Book Wanted

If any of our readers have for sale a copy of *The Moth Book* by Holland, Mr. L. D. Beadle of the Platteville Entomological Supply House of Platteville, Wisconsin, would like to buy such a copy. The book is now out of print.

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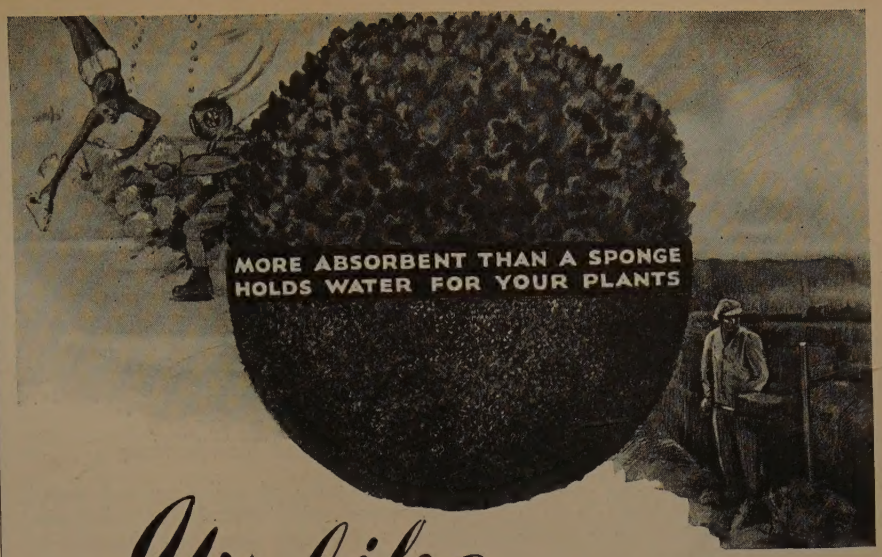

It's like a Sponge

YES, and better too! It not only absorbs moisture but holds on to it tenaciously, contributing the very advantages gardeners have always wanted most—billions and billions of tiny moisture-laden particles holding the life giving water directly where thirsty plant roots can most conveniently find it and make use of it.

Tests made at a leading scientific institution of plant research showed that German & Holland peat moss will absorb and hold at least seven times its own dry weight—that is, 700% of water. In contrast, good garden loam showed itself capable of holding about one-half its own dry weight, or, to be exact, 55%; while sand absorbed but one-fifth or 22%. Since plants themselves are made up from 60 to 95% of clear water and can take their food only in solution, the importance of this moisture reservoir is easily recognized.

Think, just by gardening with this particular peat moss you solve the moisture problem . . . turning the loosest sand or the heaviest clay into a veritable plant paradise. What a relief it must be to gardeners to know that once a quantity of this spongy peat moss is forked into the soil, they have a constant life-sustaining water supply. No further need to worry about frequent watering. What work and plant hazard this eliminates. What profusion of bloom and riotous color it assures.

No other organic is half so good. Everything you plant will grow better. This German & Holland peat moss is the very foundation of garden success. It offers the very advantages gardeners have always wanted most. A reservoir for soil waters—humus that increases the biological content of the soil . . . a perfect ground cover or mulch. And all the other points, claimed for humus, but far more effective. It binds together and gives more body to sandy soil . . . it opens up heavy or clay soil preventing it from becoming plastic . . . air circulation is increased—oxygen drawn in. And outstanding of all is the root growth promoting property—an almost exclusive factor with peat moss.

Even if you have planned not to make another improvement or add to your garden this year, you should use this German & Holland peat moss. Your plants will respond with a newness and freshness wherever it has been applied. German & Holland peat moss is the means of bringing vigorous growth, greater beauty.

Sold by seedsmen and fertilizer dealers everywhere. They will advise you how to use it effectively—either in your new garden or in your today's garden.

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PEAT IMPORT CORPORATION
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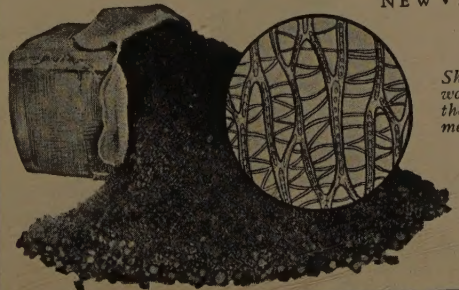

Showing interior construction of the water cell of sphagnum peat moss—the reason why it holds such a tremendous volume of water.

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For Astronomers

The Expanding Universe is a volume of special interest to those who gaze into the heavens to view its occupants and their goings and comings. In it Sir Arthur Eddington is concerned with their goings, since the book is devoted to the view that the whole material universe of stars and galaxies of stars is dispersing. With this view he goes into the reasons why, pointing to the "cosmical constant" as the reason for such astronomical developments. Relativity and wave mechanics are related to the discussion. The book is published by Macmillan and sells for $2.00.

About Florida Flora

Many years of collection and experimentation with tropical and sub-tropical plants of Florida form the background for *The Plant World in Florida* by Dr. Henry Nehrling. All this time the author kept voluminous notes on everything from trees to the smallest plants. These notes have been collated and edited by Mr. and Mrs. Alfred Kay and the result is a volume of outstanding value and interest to those whose concern is with southern flora. The book is sponsored by the Garden Club of Palm Beach and is attractively published by the Macmillan Company to sell for $3.50.

Chipmunk Farmers

In order to keep sparrows away from a bird feeding station, Mrs. A. L. Wheeler of Mooresville, Indiana, put wheat out on her terrace. This was last summer, and the feast was much appreciated by a pair of chipmunks, who would fill their cheeks, race away and come back for more. It seemed impossible that they could store as much as they took. Later on wheat began to sprout in the lawn, flower beds and the nearby hillside. The middle of February one of the chippies returned, looking very sleek and fat, and set to work carrying away more wheat. Some preserved strawberries were provided as dessert. This, however, he did not store, but would sit up and eat with great relish. He knew what was perishable and what was not.

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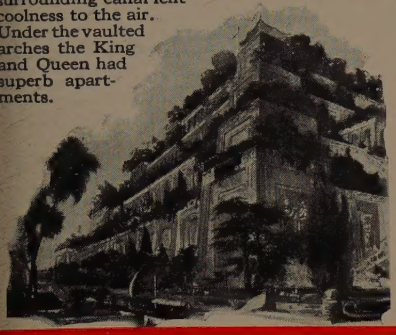

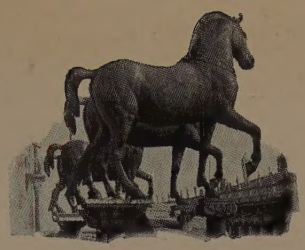

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Sculptured, probably, for Alexander the Great, these beautiful bronze beasts have been moved to Rome, to Byzantium, to Paris, to Venice. During the World War they were hidden underground. Many superb pieces of sculpture have been preserved as miraculously as these oft-stolen horses.

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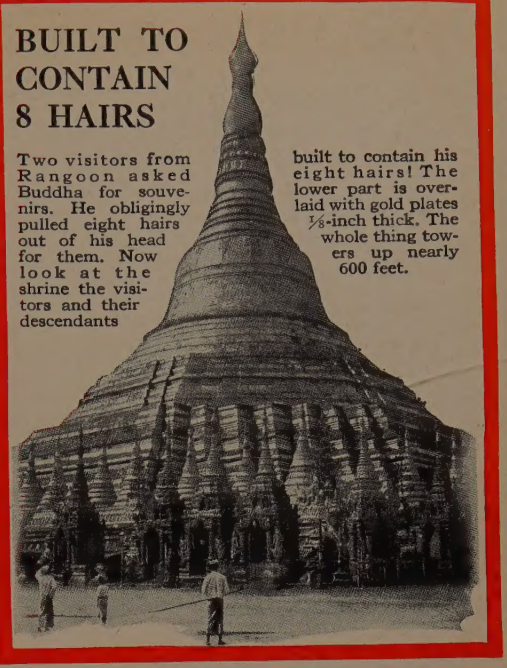

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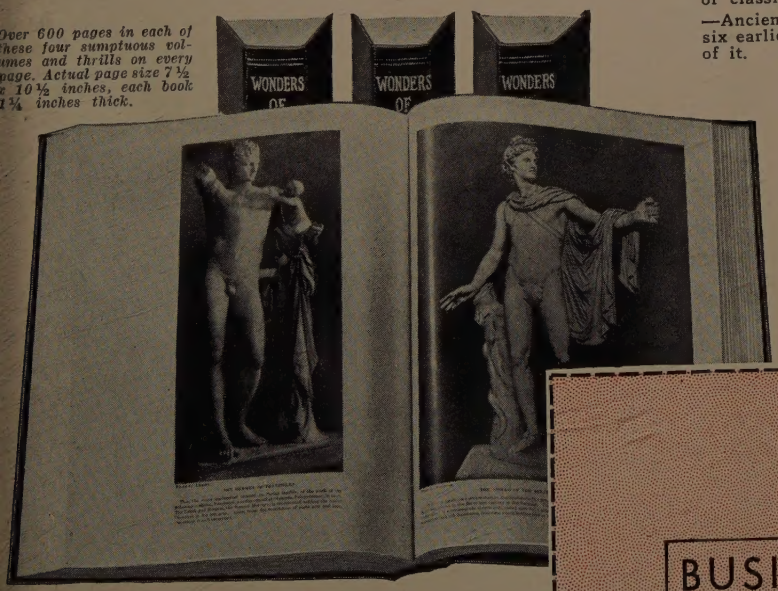

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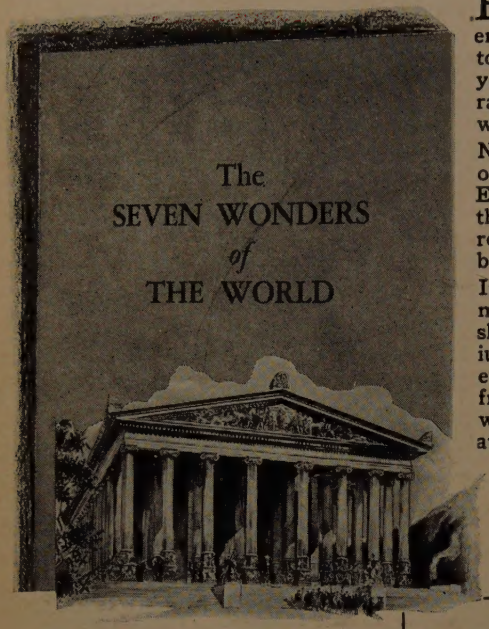

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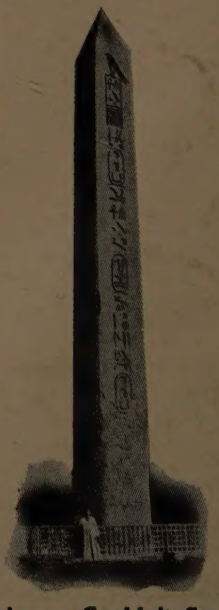

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